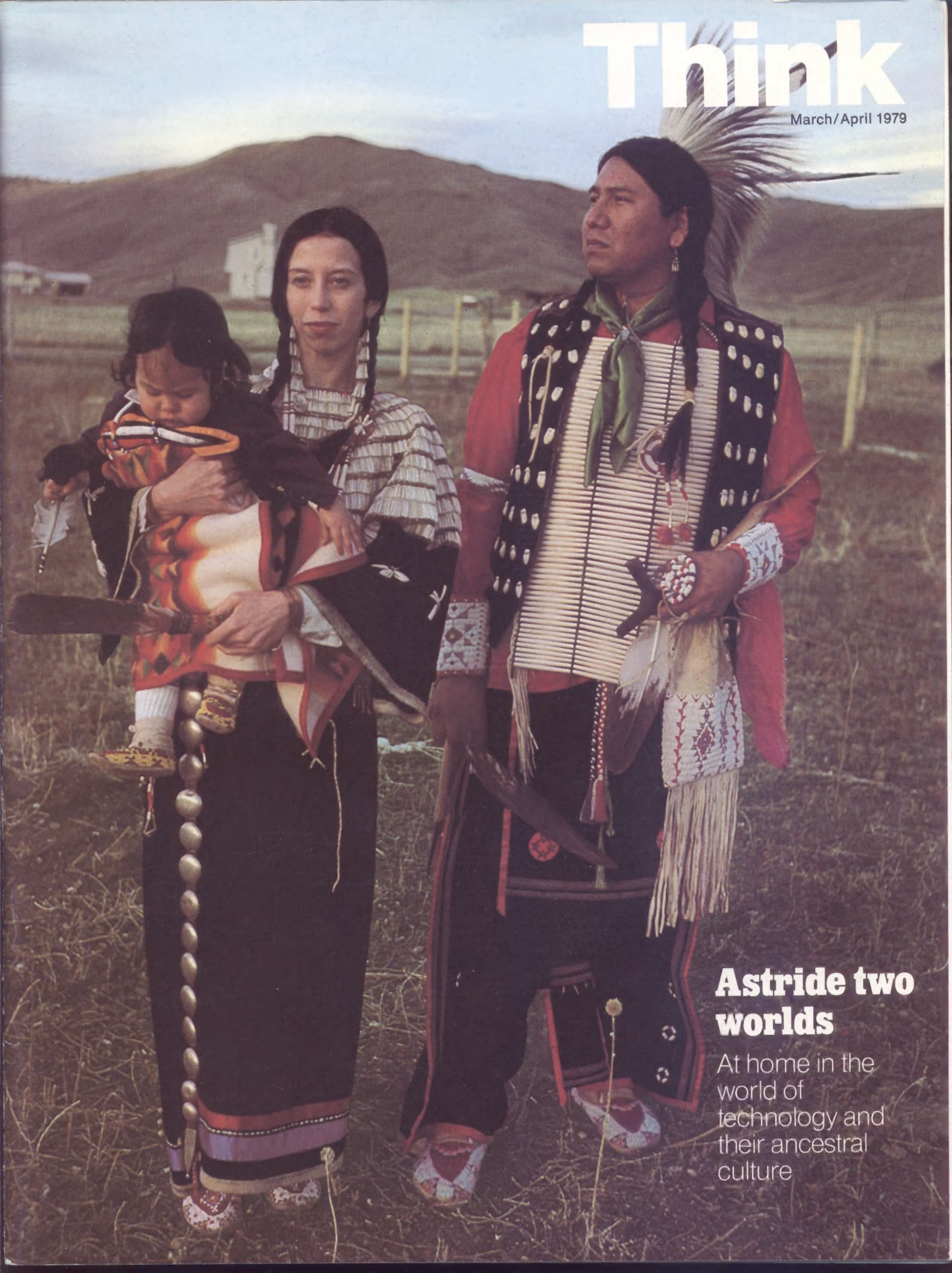
Think
March/April 1979



Astride two worlds

At home in the world of technology and their ancestral culture

Letter from the Chairman

Car pooling

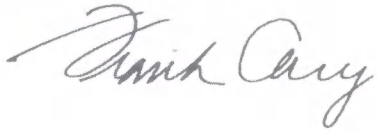
Since 1973, IBM has been emphasizing energy conservation. At major U.S. locations, we have reduced energy usage per square foot by 42 percent of 1973 pre-conservation levels. Furthermore, in the design of new office buildings, our goal is to reduce energy consumption to 50 percent of 1970 levels.

There are obviously tremendous opportunities for us to save energy as individuals. We need only look around each morning on the way to work to see how many vehicles still carry just the driver. Think of what could be saved if two people rode in each of those cars and one of the cars stayed home. That's why we undertook a car pooling campaign. We asked managers to make accommodations to assist employees in car pooling. Our aim is to make it easier for you to become part of this conservation effort.

Car pooling has not caught on among most Americans. Perhaps it's because the energy shortage isn't taken seriously. Perhaps it's because car pooling is inconvenient. But now we can't afford to sit back and do nothing.

One thing we can be sure of is that the cost of energy is going to increase. And regardless of the price, this country needs to reduce its dependence on oil imports. For both reasons, I think we should take the energy situation seriously and be willing to incur some personal inconvenience.

Whatever you choose to do, of course, is your personal decision. But think it over, and give a thought to how car pooling can reduce your expense and help you to feel better for having done your part in energy conservation.



Cover: Meet the Goes In Centers, in full tribal regalia. They work at IBM Boulder, but they follow many of the traditions of their Lakota ancestors. And they're taking care that daughter Natalie knows the best of both their worlds.

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up front

In Antwerp, a big, clean refinery

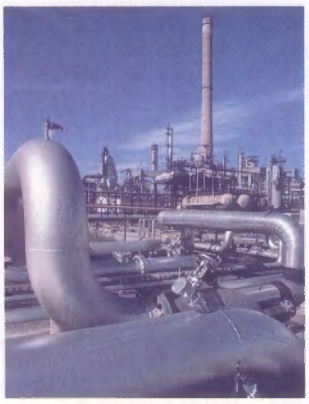
It took several years, $280 million and a lot of cooperation between Exxon, IBM people and others on both sides of the Atlantic. But the expansion of Exxon's refinery at Antwerp, Belgium, completed two and a half years ago, was time and money well spent.

Today, the 25-year-old refinery is one of Exxon's three most advanced plants. Capacity is up from 90,000 to 240,000 barrels a day, and despite its increased size, the release of pollutants into the environment has been cut back 97 percent. An average 7,400 cubic meters less waste water flows into the Scheldt River per hour than before, and, says an Exxon official, "the water we put into the Scheldt is now cleaner than the Scheldt water itself."

At the heart of the refinery's sophisticated data processing installation is a System/7 that controls and processes orders —checking them against the refinery's inventory—from the time they are received from customers until time for delivery, on a 24-hour schedule.

Installing the system took 750,000 programming instructions and was, says Robert Van Elegem, who worked on the IBM Belgium team, "a project unique in the world. We had to innovate in order to develop a solution which had never yet even been tried anywhere else."

Antwerp, incidentally, was Europe's first oil port, importing wooden barrels of crude oil from the United States as far back as 1861.



Thinking mink in Denmark

Science has long since come to the cattle ranch, but, till now, the success of a mink farmer has been pretty much a matter of touch and experience. Nobody knows why some mink pairs breed offspring with longer and more even coats than others.

That's why Danish mink farmer Aage Petersen and his son, Jorgen, shown at work in one of the long farm houses where minks are bred, intend to put their System/32 to use for something besides bookkeeping. At their Sole farm, in a remote corner of Denmark, they're building up a data bank on color, fur length and density, and pedigree of their more than 40,000 animals. They hope to find genetic patterns that can help improve pelt quality.

"Quality depends on breeding," says the elder Petersen, "and a computer can make possible a much more systematic search for improvements."

European style makes the man

There was a time—at least on this side of the Atlantic—when haute couture meant for women only. No longer. The American male went to Paris, took a look at the narrow lapels, tailored fits and side-vented jackets of such clothing designers as Yves St. Laurent, and hasn't been the same since.

Now, thanks to an enterprising French industrialist, Maurice Bidermann, and an IBM System/3, the European look is taking its place in the U.S. right alongside the best of American clothing design.

Sensing the trend in American male fashion five years ago, Bidermann Industries contracted with some of Europe's "name" designers to manufacture for the U.S. market.

The designs are stitched together in overseas plants, air-freighted to the States every spring and fall and stored in a Secaucus, N.J., automated warehouse, right next door to the company's data processing center.

As orders come in from computer terminals in Bidermann's Manhattan, Dallas, Chicago and Los Angeles showrooms, the System/3 checks the stock and generates picking routines for three stacker cranes. As a rule, the ordered garments are removed from warehouse shelves and are ready for shipping within 24 hours.

The very model of a modern rear admiral

When Admiral T. B. Hayward, Chief of Naval Operations, U.S. Navy, assembles his annual Flag Conference in Washington, D.C., in May, there will be a new flag officer aboard. He's Rear Admiral Nelson O. Heyer, U.S. Naval Reserve, Communications, better known around Armonk, N.Y., as the tall, genial manager of IBM Corporate Personnel Plans and Controls.

The former captain, who began his Navy career as a newly commissioned officer in the latter days of World War II, was notified in January of his selection to the newly created reserve communications post (he has a counterpart in the active Navy), which makes him one of 48 reserve rear admirals.

During more than 30 years in the reserves, he has headed, among others, a division to conduct Operations Research for the Bureau of Naval Personnel and received a commendation from the Chief of Naval Personnel for rewriting, and automating revisions to, the Bureau's manual. But he attributes his rise to two-star rank, in large part, to IBM's military leave program. Since his early IBM years as a customer engineer and as the personnel manager for the SAGE system, he's racked up 3,000 Navy points (the equivalent of 3,000 drills or days of reserve duty) from night and weekend service and his annual two weeks' leave.

It's come a lot farther than just six blocks

"The largest manufacturing plant built in Bedford-Stuyvesant in decades." That's what *The New York Times* calls the new home of the Data Systems Division's Brooklyn plant. After a decade in a nine-story former warehouse, the plant's 400 people moved last fall into a brand-new 172,000-square-foot, two-story brick building just six blocks away.

Over the years, IBM Brooklyn's mission has changed as much as the shape of its surroundings. It doesn't refurbish computer cables anymore, but turns out cards and boards, printers, display screens, attached processors and power distribution units.

The whole world in his hands

Some ancient astronomers were beheaded if they failed to predict when the moon would cross the path of the sun and plunge part of the earth into darkness. Astronomer Kenneth Seidelmann, of the U.S. Naval Observatory in Washington, D.C.,—shown here with a model illustrating the position of the sun, moon and earth during a solar eclipse—is grateful that the custom is no longer observed. Not that he and his fellow observatory astronomists would have cause for alarm, anyway.

With the help of an IBM System/360 Model 40, they not only knew well in advance about the solar eclipse on February 26; they knew precisely when, where and for how long it could be seen in any given locality on the North American continent and Greenland.

Astronomers first began to calculate the path of solar eclipses by hand over two centuries ago. It was a tedious process. By the 1920s, it still took a fulltime employee eight hours simply to calculate the position of the moon at one given day. Today, a computer calculates the moon's position in a matter of seconds.

Those who missed this year's eclipse may have another chance to see the moon pass between the sun and the continental U.S. But they will have to plan to be around for a while. It's not scheduled to happen till 2017.

An award for a 'can do' program

The belief—that severely handicapped individuals could be trained as computer programmers—was strong in Burt Peck, now manager of marketing aids development at Data Processing Division headquarters. It came from his experiences with the bright, capable people he met in hospitals and rehabilitation centers during his own bout with paralysis. He sold the idea to IBM management. The Federal Systems Division launched a program, seven years ago, in collaboration with the Woodrow Wilson Rehabilitation Center in Fishersville, Va.

Since then, the program has evolved into 10 community-based training programs in rehabilitation centers, hospitals and Goodwill Industries across the country; five more are planned.

FSD's involvement is supported by IBM and by a nonprofit contract from the Department of Health, Education and Welfare. For IBM's part in these programs, the Association of Rehabilitation Facilities presented the company its Distinguished Service Award last year.

Text by Claire Stegmann

What's with that coffee cup on the floor?

A third of a second—or, to be exact, 0.381881 seconds—that's how long it took that cup of coffee to tumble from the table to the floor.

During that split second, one of today's 3033 Advanced Processors could execute 1,833,028 instructions.

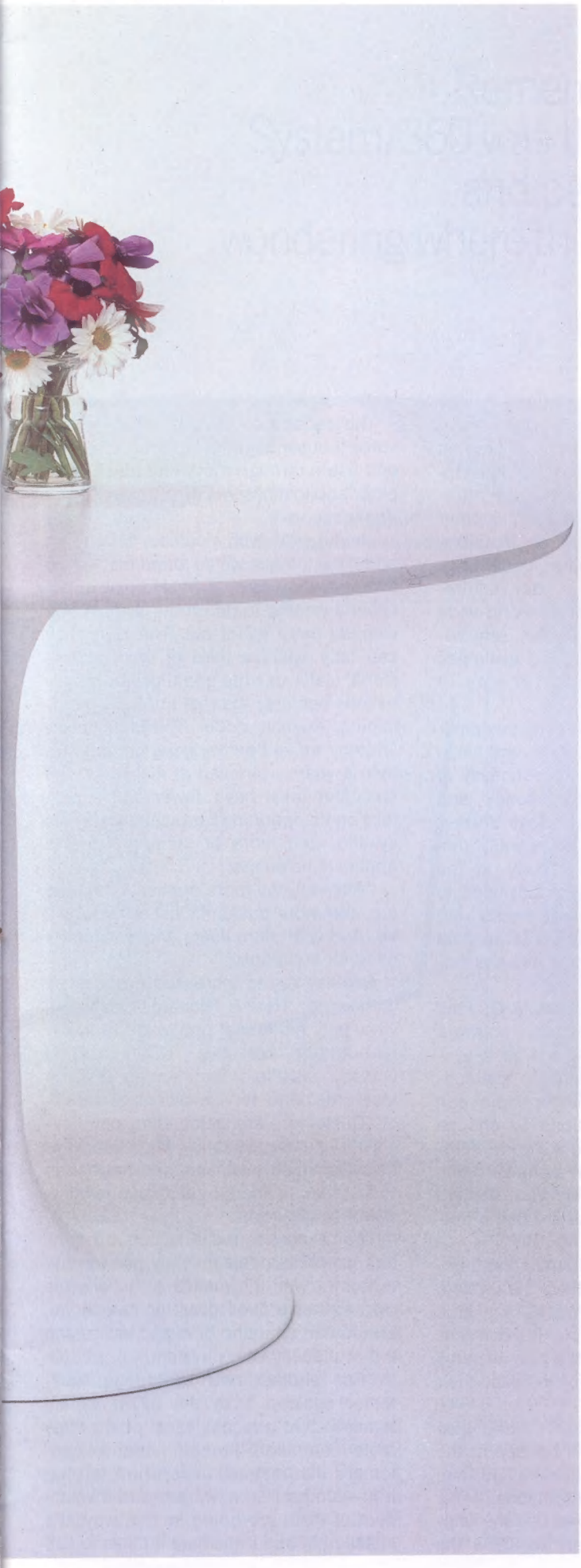
And with those 1.8 million instructions, that computer could accept inquiries from some 60 airlines reservation agents, check on whether seats were available on as many flights—in smoking or non-smoking sections of a plane—and start signals back to some 60 agents with responses to inquiries. For any one reservation, there would be a one-third of a second delay beyond processing time for the computer to locate the information from its data base.

Ten years ago, in that same split second, a System/360 Model 75 could have executed only 274,954 instructions.

And 20 years ago, again in the same interval, a 7090 could have executed a mere 68,738 instructions.

Thus, in 20 years' time, the amount of work those high-performance machines could do within that fraction of a second has increased almost 27 times. And the cost per instruction execution has declined to 1/37th of what it was.

That's productivity. More performance at less cost. And that's why the data processing industry is growing the way it is.



Tired of inflation? Try a computer

Since 1952, inflationary ups and downs have more than halved the purchasing power of the dollar—now worth an anemic 41 cents. But not so in data processing, where a 1952 dollar is now worth $180—that is, if you relate it to the steeply declining cost per computation. For innovative technology has driven down that cost 180 times.

Nor are there any signs of a leveling off. The cost of main memory in IBM's newest computers, for example, is less than one-sixth what it was only two years ago.

Largely as a result of these lowered costs and the incentive they give to new applications, computers are now multiplying at a prolific rate. A quarter-century ago, business writers were betting that the infant industry would saturate its marketplace with a few hundred machines. Today, industry sources estimate there are more than half a million systems installed in the U.S. alone, and the number of people who use computers is doubling every one or two years. With inflation worsening and the economy hard put to register productivity gains, the computer has indisputably come into its own as a proven productivity machine.

For IBM, these changes open up a promising new period of growth, with greater business volumes and hundreds of thousands more end users offsetting the lowered cost of technology.

Throughout the company, people are at work developing new ways for customers to exploit improved price/performance. Their search ranges over the whole area of data processing operations with the intent of helping customers get more out of every dollar they spend, whether it be on hardware, software or people.

In this article and the ones that follow, a few examples of what IBM is doing to tailor its services to these changes. And what the marketing divisions are doing to boost productivity in their own operations.

Productivity watchdogs: the DP Marketing Group

"A quiet revolution is underway in the computer industry," reports *The Financial Times* of London, a journal of impeccable authority throughout the world, adding—possibly with a pinch of salt—that "its implications for the computer user and supplier alike have scarcely begun to be addressed."

Not one to hazard such judgements lightly, the *Times* goes on to cite what it calls the "tremendous improvements" in price/performance made possible by rapid advances in semiconductor technology and concludes that those advances show no signs of slowing down.

Whether those implications the *Times* speaks of "have scarcely begun to be addressed" is a matter of some conjecture. But few will dispute that they do raise important questions. For example:

☐ What are customers doing to exploit the opportunities that have come with improved price/performance?

☐ What is the industry doing to help those customers find their way, to make those machines easier to use and less demanding of the resources required to get them online?

☐ And how can the supplier trim his marketing, service and support costs to accommodate larger business volumes and expanded distribution?

In IBM, one of the best places to go for answers to these questions is the Data Processing Marketing Group. This is the organization responsible for the performance of the Data Processing and Field Engineering divisions. The Group, headed by IBM Vice President John F. Akers, also encompasses the Federal Systems Division.

The Group staff plays two major roles in searching out answers. One, under James Barber, group director of product and development programs, is developing and managing systems-level offerings to increase both IBM and customer productivity — especially in installing complex software. The other, under Jack Pugliese, group director of user requirements and analysis, identifies world-wide strategic systems-level market requirements and opportunities, and evaluates IBM's major product plans in light of those requirements.

This twofold effort saves the customer time, money and people costs; and helps IBM match the improved productivity of its machines with time, money and people savings of its own. Says Barber:

"We're reducing the complexity that has caused so much difficulty in the past. It was the complexity that used to burn up so much resource—ours and the customer's—in getting a large data base/data communications network online.

"Our Installation Productivity Options (IPOs) are preconfigured software pieces, put together and run as a system before they're shipped to the customer. Now, our marketing people can say, 'Here are the options to choose from, Mr. Customer. Here are some sample job streams to run against them. Pick the one that will help you manage your network best. Install it. Push a button and go.'

"We've saved our customers the time-consuming tasks of putting the system together and, in the process, the time of our systems field people. It's one reason we're installing our big new systems in a third of the time it took to install their predecessors.

"By reducing complexity, we're also reducing the level of skill needed at the distributed ends of the system. Our aim is to make it as simple for anyone to use data processing as it is to use the telephone. It's not necessary to know the technical reasons why either one works."

The second major staff effort—to involve thousands more of those customer end users through more and more computer applications—is discussed by Jack Pugliese:

"In our work with a number of 'leading edge' customers, we've found that, on an average, they have a backlog of applications waiting to go on the system that extends three years out. They say they can only spare a third of their professional staffs to write code for new applications because the rest are busy maintaining existing code. The application strategy we've been working on for more than a year is directed at that ratio. The customer must have fewer of his professionals operating and maintaining his system, and more of them getting his applications online.

"After all, the more applications there are, the more customer users there will be. And with more users, the greater the need for computers."

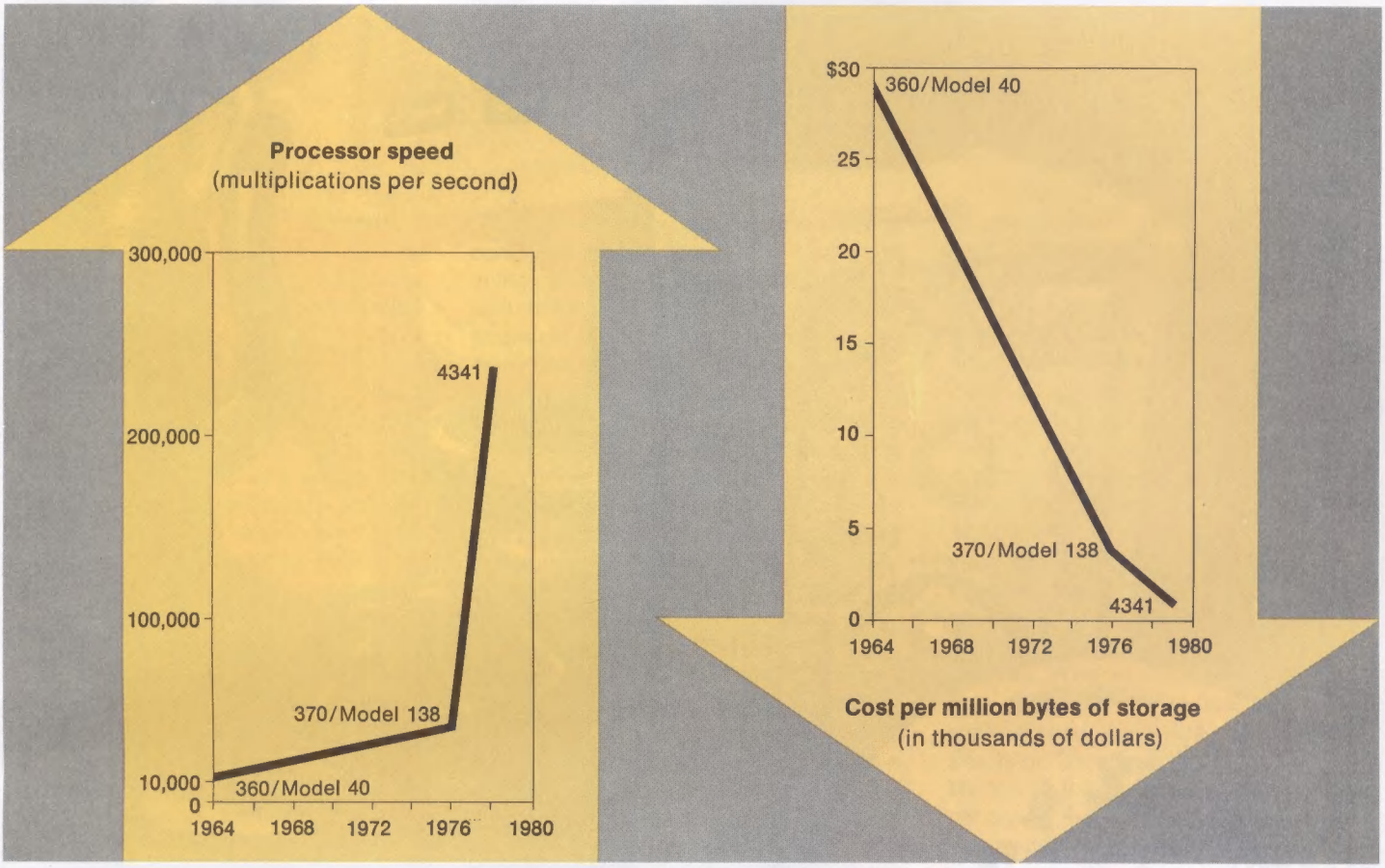
Another key to increased productivity is service. Here's Richard Liebhaber, who, until his recent promotion to assistant group executive, DP Marketing Group, was Field Engineering Division vice president, service planning:

"Customers are demanding new levels of systems availability, improved ways of determining problems and new ways to fix them. In short, better ways to manage their networks.

"For example, the IBM support centers we announced recently provide the customer with the means of making his own software fixes over the telephone, saving him time and cost and increasing the availability of his system.

"For another, we encourage 'customer set-up.' Take the 3278 display terminal that attaches to a local or remote computer. It's being sent to customers with instructions on how to plug it in—almost like a TV set, and 95 percent of them are going in that way. It's installed in about the time it takes to call

Remember when System/360 was the latest in technology and people were wondering where things could go from there?



a CE. Now the customer calls us only if the machine doesn't work, which, we find, is very rare."

Meanwhile, over at the Data Processing Division's headquarters in White Plains, Michael Quinlan, director of systems support, plays an important role in implementing the productivity gains being made, both by the DP Marketing Group and the division itself. "We're making progress in many ways," he says. "First, we've organized centers to provide better installation support. We had eight product support centers, each focusing on a particular product. But our customer viewed all our products as a single system, and was spending resources to integrate the functions on his location. So we've consolidated the centers into two *systems* support centers—one in Gaithersburg, Md., and one in Palo Alto, Calif.

"Through our Early Support Program for networks, we're finding ways to improve the documentation, the education of our people and the customer's, and other means of shortening installation time for our network customers.

"Our earlier experiences with the advanced communication function products have provided valuable feedback to our development people in the System Communications Division, as well as DPD development groups who provide systems engineering aids and tools. The first installation took about five months. The last took about a month and a half.

"Another area is specialization. Five years ago, nearly all our systems engineers were assigned to customer accounts. Now, 40 percent specialize by product. We work closely with DPD education to ensure that those branch specialists receive the latest data on new products. They are then able to help any sales rep who needs answers to customer questions about a given product."

It all adds up to an intensive effort to give the customer more value for his data processing investment—not only today but in the mid-1980s, when "IBM value added" will have to pay its way as a convincer like never before.

—HARRISON KINNEY


OF AMERICA
ONE DOLLAR

How to save time, money, shoe leather and a wait at the gas pump

What the marketing divisions are doing to make things easier, quicker and more productive.

by Dan Rosen

Kenneth Ketcham, a lanky, quick-minded advisory systems engineer who works out of the Data Processing Division branch office in Lansing, Mich., had a problem. His customer, the Oldsmobile division of General Motors, had a clear and demonstrable need for a special kind of IBM software. Unfortunately for Ketcham, however, there were some 70 different people at Olds directly involved in the purchasing decision—engineers, programmers, managers and the like. Reaching these prospects through one-on-one selling would be slow and costly.

As an alternative, Ketcham took advantage of a new kind of sales demonstration seminar. By using a specially designed, seven-foot-diagonal video screen, he was able to show his offering to all the prospects as a group. "Instead of trying to do it in many small sessions," says Ketcham, "we save anywhere from three to six months of marketing time."

As impressive as it may appear to the casual observer, the DP video screen seminar is but a symbol of happenings that are far more significant. Even better ways are being found to make IBM's marketing efforts more productive. Even better ways are being found—to use the marketing reps' time-honored catch phrase—to get more bang for the buck.

Several factors have brought a special kind of urgency to this effort. The most important is the magic of new technology. A series of computations that cost the customer $1.26 to do on an IBM computer in 1952 can now be done for 7/10ths of a penny.

With this scaling down of the price of computation, two things are happening in the marketplace: There are many more customers for lower-priced machines; and there is not enough spread between manufacturing costs and selling prices to support a traditional sales effort. The challenge, more than ever, has shifted to selling—how to reach more prospective users in the most productive ways.

Innovation in marketing can be seen throughout the company. Success stories are surfacing in division after division. Here are some highlights:

Data Processing Division

Four years ago, the Data Processing Division pulled all its marketing productivity programs together under headquarters management. This has led to a series of marketing and installation support programs for the field—standardized for maximum impact—that can change or shift regularly to meet the changing needs of the marketplace. This year's marketing programs, called "Delta '79," focus on a selected number of DPD software products, which were designed to help increase customer efficiency. In all, some 500 man-years of IBM planning, organizing and selling effort have been saved since these programs came into being.

Then, in 1976, DEMO was introduced. It offers the DPD field marketing teams all they need in the way of hardware and software to make quality sales demonstrations. In the past, these demonstrations were developed by the branches through trial and error. Now, headquarters provides everything for reference at a glance, contained in a growing library of easy-to-follow guidebooks. There are descriptions of particular markets, explanations of the problems of specific industries, outlines of hardware and software requirements, foils and even scripts for actual presentations. Computer equipment is available for all of the branches, complete with the software to run it. Before, no more than a thousand demonstrations were possible nationwide; last year, with DEMO, the total reached 14,000.

Another way DPD is improving marketing productivity is through SNAP/SHOT. Although the acronym somewhat confusingly stands for "Systems Network Analysis Program/Systems Host Overview Technique," it is actually a highly sophisticated hardware and software simulator, headquartered at the DPD Marketing Support Center for Communications in Raleigh, N.C., to demonstrate new applications to very large customers and prospects.

What's the difference between DEMO and SNAP/SHOT? "DEMO is like showing you a space capsule and letting you work the switches on it," Jack Harris, DPD manager, communications systems analysis, explains. "SNAP/SHOT is like simulating a round trip to the moon."

In practice, SNAP/SHOT works something like this: Let's say that a customer wants to increase the use of his computing system by adding new terminals or programs. By using the information the customer provides about his current system and his new requirements, SNAP/SHOT can simulate the new system to show exactly what will be needed in the way of new equipment and telecommunications lines, and how well it all

will perform. It is a valuable tool for planning and prediction, permitting the customer to build a complete "model" of the new system he's considering.

How does it pay off for IBM? "Since its inception in 1975," Harris reports, "some 620 customers have been to Raleigh for simulations. In one case alone, SNAP/SHOT saved 11 man-months in selling time over what would have been necessary if the system had been guesstimated or actually constructed. In others, the sale would have been lost entirely."

Office Products Division

DPD customers include the giants of the American economy, numbering in the thousands. The Office Products Division, on the other hand, calls on accounts of all sizes, and they total over a million.

At the OPD branches that serve those accounts, a computer-generated report is received every 90 seconds, on the average, from CAM, the OPD Computer Assisted Marketing system.

CAM produces a variety of analyses and reports that provide input to sales proposals and customer presentations, contributing significantly to OPD marketing representatives' productivity. "Furthermore," says Frank Frost, OPD's vice president, marketing services, "CAM's level of detail and accuracy lends a high degree of professionalism and credibility to our sales force and, in most cases, quickly provides information that would take hours for the marketing representative to compute manually."

The newest addition to the CAM library is a program to assist in marketing the new IBM 6670 Information Distributor, announced in February. A prime application for the multi-function machine, which prints at high speed with laser technology, is to print online from a computer, and CAM assists in determining the processing time required for a customer's specific application. This is invaluable for both proposal and installation support.

CAM is indispensable for marketing IBM copiers, which, in part, involves an analysis of customer copy volumes and pricing, application determination and a proposal. Before the CAM program was available, the sequence of events was an extensive, time-consuming process. Copy-CAM programs now quickly provide cost analysis, price determination from among a variety of choices and detailed proposals.

Other CAM programs are used in analyzing a customer's office workload for designing a word processing system and for preparing financial decision-making analyses. All of these computer-based productivity aids require the marketing rep to gather input through interviews, questionnaires and optical mark read cards.

Then, too, at OPD, there is IBM Direct. The program involves the marketing of OPD supplies, making use of what is known as "direct response advertising." How does it differ from ordinary advertising? Direct response advertising asks for the order by mail or telephone.

The effort appears to be paying off. The order rate is high for direct mail, and surveys have revealed that both readership and customer satisfaction are excellent.

Information Records Division

Meanwhile, the Information Records Division is boosting productivity through its Tele-Marketing program. Tele-Marketing simply means selling by telephone. And while the effort is still in the test stages, preliminary results have been impressive.

"For the most part," Larry Apperson, IRD manager of market development, points out, "our division sells parts and supplies in support of the Data Processing Division and General Systems Division equipment. With GSD's phenomenal growth and ever-increasing base of small business computer users, our challenge is to support them and help them to continue to grow. We know we can't do it with one-on-one selling alone; the size of the average supply order in this market is just too small to justify a face-to-face sales call."

Selling by telephone could also be time-consuming, were it not for an important twist. Curt Hoopingarner, IRD's manager of market development programs, has automated the effort: Each Tele-Marketing rep sits in a comfortable, soundproofed cubicle, with a telephone, a notepad and a computer terminal.

The terminals give the reps almost instant access to virtually all they need to know about their prospects: the type of equipment they have installed, the kinds of parts or supplies they might need, how interested they might be in buying from IBM, when they were last contacted and what their reaction happened to be. The system can also give the rep a list of the best prospects for any items in the IRD line—what they might be buying and paying for them.

What about results? IRD's Tele-Marketing reps are now handling four to five times as many accounts as their counterparts in face-to-face selling. Each Tele-Marketing rep makes about 20 sales calls a day—a number far in excess of what would ever be possible

With faster and cheaper computers and low-cost memory, more applications can mean more users; and more users, more computers.

on the road. Small wonder then, last January, that Hoopingarner was the recipient of an IBM Outstanding Innovation Award.

General Systems Division

No catalog of innovations in sales productivity would be complete without mention of General Systems Division's Business Computer Centers, now marketing the moderately priced 5110 Computing System.

"The most creative thing, the thing that jumps out at you about these centers," James Dezell, Jr., GSD vice president, field operations support, explains, "is that they fulfill the small businessman's need for one place to obtain answers to all of his questions concerning computerized solutions to his problems. Demand for the 5110 certainly exists; there are 400,000 small companies and organizations that need the capability of the 5110 and can justify its costs. Therefore, we are building a network of Business Computer Centers and staffing them with good sales and systems people."

The Business Computer Center concept should not be taken lightly. "When it comes to how we market our products at IBM," Robert Cersosimo, GSD's manager-5100/5110 programs, points out, "things are only changed when we're certain that we've found ways to do them more economically, or faster, or in ways that will satisfy our customers better than in the past."

"The first Business Computer Center opened in January 1978," Dezell continues. "By the year's end, there were 22 in place; today, there are 48. In Houston, the center is on the lobby floor of a new office building. Elsewhere, they are part of the regular GSD branch offices. For the most part, they are fully equipped, self-contained units, with reception areas, product display rooms, seminar and demonstration rooms."

Advertising has been crucial to the program. This year's effort led off with a media campaign. In January, full-page newspaper ads appeared simultaneously in cities with the business centers, followed by a week-long radio push, bolstered by mailings to selected prospects.

"During 1978—the first full year of operation—the Business Computer Centers racked up the highest number of new-sales-per-sales-rep in the General Systems Division," Dezell reports. "They have proven that they are a good way for us to do business. Perhaps more importantly, they are a way to provide a higher level of customer satisfaction. Our studies have shown that customers like the idea of a place where they can find answers to their problems—whether they're considering a purchase, are in the midst of an installation, or looking for ways to get more out of their systems."

But the most convincing evidence of success may be this kind of endorsement from a disinterested outsider. Last December, a business writer from a Southern California newspaper heard one of the radio spots advertising the Orange County Business Computer Center and decided to stop by for a visit.

This is what he saw and reported in his paper:

". . . this presentation is a great selling job and conducted by a super salesman. [E. P.] Cook, sometimes in a subtle manner and sometimes not so subtle, leads his listeners, with the help of color slides, from point to point right down to the dotted line.

"When he finishes the three-hour session, there can't be much doubt in the listeners' minds that they need a computer, need it desperately, and, in fact, wouldn't consider any other make than IBM." □

Here's looking at you

One of the few pluses to turning 35 is IBM's health screening program.

by Edward F. Pierce

Even under the best conditions, traffic on New York's Cross Westchester Expressway is no picnic during the morning rush hour. This particular day, one of those bone-freezing ones in February, a light snow had fallen to create not a winter wonderland but a traffic jam of nightmarish proportions. A trailer truck didn't help matters when it jackknifed on the icy pavement.

Nothing moved, and the arctic-like air was appropriately blue with invective.

"What a day to have your blood pressure checked," my traveling companion mused. It was no idle jest. I was, in fact, headed for a screening examination at IBM's medical facility on the first floor of 1000 Westchester Avenue in Harrison, N.Y. The appointment had been set for 8:45. It was now 8:42, and 1000 Westchester was still at least 10 miles away.

Ultimately, however haltingly, traffic did move, and about mid-morning, it was indeed blood pressure time. In the examining room, the inflatable apparatus clasped the flexor muscle of my upper arm, and Fran Kilgus, R.N., was at the controls, pumping air.

"Hmm," she said. "Your blood pressure is a little high."

End of jest. But blood will tell. And it will do so in more ways than one through IBM's voluntary health screening program. For the exam, which is conducted by registered nurses, entails not only blood pressure, but blood sampling for half a dozen kinds of tests. And that's far from all. By the end of an hour and a half, this volunteer had also:

Pondered and answered 167 questions that ranged from those concerning childhood diseases, like mumps or measles, to adult ailments;

Been wired from chest to ankle for an electrocardiogram, which traces all those peaks, valleys and plateaus of the heart's activity;

Sat in a box—like one of those on an old TV quiz show—and responded to the beeps of a hearing test;

Peered through a set of nonportable binoculars hooked up to a black box to see what I could see (and was told I had a lazy right eye);

Pressed against a somewhat chilling apparatus—it was coolish without a shirt—for a chest X-ray.

And more.

The result is a personal health profile, put together in the belief that preventive medicine is, after all, the best medicine. The IBM voluntary health screening program was conceived by Dr. John C. Duffy, the company's medical director, who has guided the program since it was launched a decade ago. During those 10 years, 70 percent of eligible employees in the U.S. and Canada have participated—95,000 in all. (You're eligible for the exam every five years, beginning at age 35.)

In the 10-year period ending last September, more than 200,000 health problems were revealed by the program. Of these, more than 86,000, or 42 percent, were previously unknown. Among the specific ailments were some 3,600 previously unknown cases of hypertension. High blood sugar, thought by most medical authorities to be a precursor to diabetes, was found to be previously unknown in 10,012 (or 87 percent) of 11,481 clinically significant cases. More than 130 new cases of diabetes were revealed. The number of various heart ailments detected came to 6,464; of these, 45 percent were previously unknown.

Do people do anything about these findings? They do. Among all the men who had taken two health screening exams, for example, 41 percent of those with hypertension in the first screening lowered their blood pressure to normal ranges; and 45 percent of the female participants lowered theirs.

But, as the old adage goes, why trouble trouble till trouble troubles you?

Dr. Arnold Kaminer, IBM's medical director of the Westchester region—as well as the company's other regional medical directors—will tell you why, and anything else you might want to know about the program.

Blood pressure? "If you find you have high blood pressure," Dr. Kaminer explains, "one or two things might be done. You might find a cause that's completely curable. And even if you don't find a cause that can be cured, you can usually treat it with medication. Treatment can prevent stroke, heart attack and all sorts of other complications that could arise in the future. This is an excellent example of why the program is worthwhile, because high blood pressure often shows no symptoms until the devasting stroke, heart attack or kidney destruction has occurred."

Blood will also tell when it's drawn for clinical tests, and anyone who has ever had blood sampled knows it is taken from both the arm and the middle finger. But why? Blood from the finger, for example, is used to test for anemia. As Dr. Kaminer points out, "One cause of anemia could be an undetected 'silent ulcer' that is slowly bleeding. A person who has one may find that he or she tires very easily, and chalks it up to age. Age may have nothing to do with it."

The arm, on the other hand, yields venous blood, which is used for tests that reveal conditions such as diabetes and high cholesterol. These are things you can do something about, Dr. Kaminer says. "If you have high blood fat levels, it's quite possible to control it through judicious dieting. We also test for gout, and measure kidney and liver function. We can use these tests to help identify and, hopefully, ward off a lot of things."

Recalling the electrocardiogram, and being "plugged in" at 12 different points, this volunteer wondered how it worked.

"What it does," Dr. Kaminer says, "is measure the electrical activity between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'I had an exam up in Endicott back in '52. I guess you wouldn't have the X-ray.' But they do.

two points. The ECG is a vector analysis, which means that it gives the direction of the force and the amplitude of the activity. The thing in your chest wall that's producing electrical activity is your heart. The ECG makes it possible to state indirectly the various things that are happening in the heart. If, for example, somebody has had a heart attack, the piece of tissue that's been destroyed doesn't generate electrical activity because it's scar tissue. That will show up on the ECG as an area of no electrical activity where one would normally expect to find it. It can also demonstrate insufficient blood supply to the heart, or what's known as angina."

Some results that turn up in the screening program are simply variations from the norm. As Dr. Kaminer says, "In a lot of things in medicine, you're not dealing with absolutes, but with a fuzzy line between what we call health and disease. In the individual who takes the exam at age 35, the variations found are more likely to be normal variations than diseased ones. So, if a variation of a cardiogram is the same at age 50 as it was at 35, that's nice to know. If, on the other hand, there's a variation at 35, it could also be indicative of early arteriosclerosis. So, when you do another ECG at a later date, and the variation has trended a bit further, you're in a much better position to say, 'Hey, something's going on here.' "

What about people who decline the screening on the grounds that, "If something's wrong, I'd rather not know"?

"On a personal basis," Dr. Kaminer says, "I never try to be a salesman. If I were talking to a group of people, however, the approach would be something like this: If something is there, it won't go away just because you don't want to know about it. And the longer you choose not to know about it—depending upon the situation—the greater the likelihood is that it will be either more difficult to do something about it or too late.

"I think it's important to stress that the data is confidential," Dr. Kaminer adds. "Without the express permission of the employee, nobody outside of medical can see it, not management or anyone else. Say, for example, we find that someone has pretty severe diabetes, and we think it would make sense to put a driving restriction on that person, based on a finding of the screening tests. We would not do so without that person's agreeing to it. This doesn't prove to be a problem, because if there is a logical reason for restricting activity, almost everyone is going to be concerned enough about his or her own health to do so."

Anyone who takes the voluntary health screening is notified of the results and has the option of having them sent on to a personal physician. He or she may also have a copy of the exam report. But Dr. Kaminer has a caveat here:

"If we let you have the hard copy, a professional person should be present to answer any questions you may raise; otherwise, you may be worrying unnecessarily about something you didn't understand. This is why we prefer to have the exam sent to the employee's personal physician."

All the health screening data gathered that February day was batched and sent to the IBM Medical Systems Center, a two-story building in Elmsford, N.Y. As Gerald Hillman, manager of the center, says, "Our mission, principally, is to aid the IBM medical professionals in promoting and protecting the health of employees."

The center, he goes on to explain, has its own clinical lab with analytical equipment for things like the blood tests, and a toxicology lab. It also has its own computer room, systems people and programmers. Equipment consists of a System/370 Model 145, disk drives, tape drives and a System/7. "After all the machine-readable forms are read by the scanner, the lab work completed, and the ECGs analyzed," Hillman explains, "the data are combined and processed on the 145, which generates a final medical summary report, one that shows the results of the current as well as any previous examinations. The data are stored for future reference on disk files."

The center's data base is one of the largest of its kind in the world. "It represents a wealth of information on a segment of the North American working population," Hillman points out. "The data are periodically analyzed—not on a personal basis, of course, but statistically—with many articles and papers having been accepted by scientific journals."

The Medical Systems Center regularly updates its files and searches for those who will become eligible for screening, then prepares a list for each of the company's 33 medical departments in the U.S. and Canada. A letter of invitation is then sent to the employees by the IBM medical department, accompanied by a brochure that, Hillman says, does several important things. "First of all, it informs employees what will happen during the screening examination. Second, it tells the person what won't happen. That is, a physician is not going to be routinely involved in the data-gathering phases. This makes the point that it's important for the employee to follow up with his personal physician, not only on results of the screening, but also for a more complete physical exam."

When the test results are being processed, Hillman says, "we don't wait to generate a complete report if the medical review at the data center tells us that something is grossly out of line. We call the medical department immediately upon verification of the results to let the employee know right away that something might be wrong. Sometimes it's a false alarm. You have to fast 12 hours before the exam, for example, so that your blood is right for the tests. Some people misunderstand and have orange

juice or coffee before the screening. Even a small amount could result in a test indicating—mistakenly—diabetes or some other potential problem."

Echoing Dr. Kaminer's comments on that "fuzzy line" between health and sickness, Hillman says, "It's no longer a normal/abnormal world. We compare the person with a peer group—and even that's not quite as good as comparing the person to himself, over a period of time. It's important to use the person himself as a reference. That's why it's so valuable to have a previous exam, made some years ago, to compare to a current one."

"A great thing about an IBM medical record," says Dr. Kaminer, "is that it's always available for reference. A chest X-ray, for example, is irreplaceable. It's been my experience that people move, doctors retire, hospitals throw out old records. And I don't know how many times it's turned out that IBM is the only place in the world that has a historical X-ray or ECG.

"For example, here's a fellow going to his doctor, and the doctor spots a small nodule on the patient's lung. 'It could have been there a long time,' the doctor says. 'Do you have an old X-ray?' The patient checks with a local hospital where one was taken some years ago, but it can't be found. Finally, he goes to his IBM medical department and says something like, 'I had a pre-placement exam up in Endicott in '52. I guess you wouldn't have the X-ray.' "

Of course they do. It turns out that the little nodule was there in 1952. So it's nothing new, and there's probably no problem.

"Even when you retire, we hold on to your records," says Dr. Kaminer. "So, when you're 90 years old and say, 'Good Lord, I retired from IBM 30 years ago. I wonder if they still have my old medical records,' the answer is, yes, we do." □

Scouts' honor: Big outing for a homegrown computer

It's election night at the National Explorer Presidents' Congress in Washington, D.C., and 2,500 teenagers are on hand for the excitement. The convention floor is a tangle of shouting, gesturing delegates. Confetti is flying, loudspeakers are blaring, a marching band struts along the corridors. Meanwhile, at their posts to the left of the chairman on the dais, a team of imperturbable young computer operators is tabulating the ballots.

In short, it is a simulation of a real political event. Simulated, that is, in every respect but one: The computer is very real indeed. It is a microprocessor built from a hobbyist's kit, and it has been assembled, programmed and operated by IBM-sponsored Explorer Post 300 from Mobile, Alabama.

"You can't believe how well these kids have performed," says National Explorer staff member Brian Archimbaud, who acted as advisor for the election. "It was just incredible. By the time the last delegation had cast its votes and the chairman had stepped to the rostrum, the results were already there waiting for him. It brought a tremendous credibility to the whole election process."

This wasn't the first time that Explorer Post 300 had made its mark. In 1977, it took first place in the Mobile Area Scout Exposition with its exhibit on "Computers: Past, Present, Future." In 1978, another first-place prize came its way for a demonstration of the microprocessor it had assembled. Then came the invitation to demonstrate the system at this April's conference—along with a request that the post members act as staff to help run the event. Post 300 started packing.

All this success is especially heartening—but not surprising—to Laureen Hendry, a General Systems Division systems engineering manager who acts as advisor to Explorer Post 300. She has seen its members, which have more than doubled in less than two years, do well in anything they've tackled.

"The computer we took to Washington was the kids' idea from the start," she says. "We broke them down into work groups—one to actually build the computer from a kit, another to learn programming so that we could enter software into the system, another to work on display booths for demonstrations."

Other IBM people lent hands. Peggy Brady, a Field Engineering customer engineer, gave lessons in programming. Frank Braswell, an FE field manager, worked with the youngsters on assembling and wiring the hardware. Thomas Clement, a Data Processing Division branch manager in Mobile, and Terri Peoples, a DPD systems engineer, were on hand for advice. And Ernest Moore, a GSD systems engineer, helped develop the software for ballot processing.

Exploring is the young adult division of the Boy Scouts of America, open to boys and girls between the ages of 14 and 20. Most Explorer posts are organized around a particular hobby or career interest, such as law enforcement, architecture, flying or sports. For the members of Post 300, who traveled 22 hours each way by bus and train for the Washington outing, there's little doubt that the computer's the thing. —Dan Rosen

Astride two worlds

by Claire Stegmann

Five afternoons and evenings a week, Jhon Goes In Center is a senior plastics press operator, working second shift, at the IBM plant in Boulder, Colo. Dressed in jeans and a western shirt, his long black hair pulled into a ponytail beneath his cap, he sits beside a hydraulic press, in a building filled with the echoes of modern machinery, and turns out plastic, high-tolerance parts that go into thousands of IBM typewriters, copiers and other machines.

On spring and summer weekends, wearing the headdress, breast plate and war bustle of his ancestors, Goes In Center is a Lakota Indian war dancer on the Great Plains of South Dakota's Pine Ridge Indian Reservation, singing the songs his ancestors sang when they hunted the buffalo there generations ago. The rest of his spare time is spent on a 10-acre spread above Loveland, Colo., caring for his Appaloosas and his year-old daughter Natalie, and turning out custom-made jewelry and Indian artifacts in his home workshop.

His wife, Kate, is a mechanical designer in the plant's first shift; between them, they provide Natalie with an optimum of parental care.

"Indians will always be different," Jhon Goes in Center believes, "because they grow up differently and have a different set of values. But you learn to live in both worlds, to take what suits you from each." Curious to learn how he and Kate accomplish this, we visited them recently at the Boulder plant and at their Colorado home.

Today was just a routine day, Goes In Center told us, seated at his work station and rolling his chair easily from pressure gauge to press to desk, as a neighboring operator came over to match notes on the day's printout instructions. With a sharp-edged tool, he deburred the rough edges from the small white plastic parts as they fell from the press. More to his liking are the days when parts the size of an auto hood are called for and he must help set up a giant press. Or times when an emergency arises and it is up to him to set up an entirely new mold to keep the workflow moving.

He's been at the Boulder plant two years now. Kate preceded him, six years ago. She began as a temporary clerk with the General Products Division, got promoted to drafting and went from there into mechanical design. When GPD announced plans to move to Tucson, she transferred to the Office Products Division.

Jhon and Kate Goes In Center move easily between the corridors of work and ancestral plains.

Clad in the attire of a Lakota war dancer, Jhon Goes In Center, great-grandson of a Lakota chief, poses on his 10-acre spread above Loveland, Colo. In his working clothes, left, he is just as much at home checking the tires on wife Kate's Audi.

We found her, many corridors away, standing over a layout on the drafting table in her office. "I design parts and do tolerance analysis," she explained. "If this swings up here, what happens over there. If I have questions, I go to the engineers." She is a veteran of several task forces for the IBM Series III Copier.

The Goes In Centers move easily through the plant corridors, with occasional hellos to acquaintances. Jhon is a member of the plant's basketball league. But they are never far from reminders of that other world they share. He hand-tooled the leather belt he wears, and his watchband is a strap of red and blue beadwork. She wears delicate silver earrings, crafted by her husband, and proudly displays a picture of her infant daughter in her cradleboard. We made plans to see them at home the next day.

At home, Jhon spends much of his time with his daughter, Natalie. He and Kate are teaching her both family tradition and modern ways.

"I'll meet you at the Olde Cheese Shoppe," Jhon Goes In Center had said, and we found it, as he had directed, around the lake among the cottonwoods and pine above Loveland. We bought some cheese from the chatty proprietress, then went out again into the sunshine, just as a blue pickup truck churned to a stop a few yards away, and Goes In Center got out. He was wearing a western hat, his hair neatly braided. "Follow me," he said simply, climbed back into the truck and was gone, in a swirl of fine, powdery dust.

We followed, out beyond a jagged clay-colored ridge of rock named Devil's Backbone, turning in, finally, to a road running the length of a fenced pasture. At the end of it stood a white ranch house with a bay window.

His 6′2″ frame looked even more imposing with the tiny girl in his arms. "This is my daughter, Natalie," he said. "Kate will be along later."

We went inside. Family pictures, including a sepia of Goes In Center's great-grandfather, Chief Lip, adorned the living room. Also a flute, a prayer pipe, a breast plate made of bone, recently completed, and Natalie's first pair of blue-beaded moccasins, made by Kate. "She's something of an artist herself," said her husband, who had his first one-man show three years ago at the Sioux Indian Museum and Crafts Center in Rapid City, South Dakota.

Goes In Center depended on his silver craftsmanship and his painting (an abstract of Indians and tepees, in warm rust tones, hangs in his living room) to help support his wife in the early days of their marriage. He received a certificate in museum techniques from the University of Colorado in 1971, "but the only museum job I could find was in the city. I'd rather live in the open, and it's got to be close enough to Pine Ridge to take my daughter there every weekend I can. I want her to know the things I know."

As we talked, Natalie crawled happily about the carpet in tiny moccasins, playing with a toy beaver with a beaded tail and a small buffalo.

"Kate and I have read books about how you're supposed to bring up children," he said, "about what happens if you scream or holler at them. But we just know, from the way we were brought up, not to do that. Children are *very* special. Natalie is already a little individual, and we try to treat her with respect. If she does something wrong, well, it's no big deal. I think she'll learn most by watching us, which means we have to watch ourselves. In Indian language there are no cuss words, so we don't have to worry about that."

Goes In Center spent his own early childhood at Pine Ridge. He later moved with his parents and two brothers and six sisters to an Army depot 60 miles away, where his father worked, but he returned to the reservation to spend summers with his grandmother. When the government closed the depot, the entire

At the plant, Goes In Center checks the performance of a new Husky press, which turns out ribbon cartridges. Tube carries plastic from bin to press.

family returned to Pine Ridge, and Jhon was sent to a Catholic mission boarding school in eastern South Dakota ("We were fortunate that we weren't real poor."). After a year at Northern State College, "it seemed I'd been going to school all my life, so I took a year off and just found jobs here and there, and then I went into the service."

Though his wife was born and grew up on Rosebud, a reservation bordering Pine Ridge, it was not until they were students together at the nation's first tribally controlled Indian college—the Navajo Community College in Arizona—that Jhon met Kate. They married, returned to Pine Ridge, and he joined VISTA for two years. While he was studying museology at the University of Colorado, Kate found a job at the IBM plant.

The Goes In Center surname, Jhon told us, was explained to him by an elder member of the tribe. It was given to a great-grandfather who, though "a very humble guy," was noted for his courage. Where other braves would vie to lead retaliatory raids against the Crow, he would invariably be chosen, and brought into the center of the council circle.

It was Jhon's male relatives, especially Ground Spider, who, during summers spent with his grandmother, taught him to dance. They provided his first outfits. "That's the tradition. You don't just go make these things yourself and start dancing. As the years go on, you learn how to make them, from others." The owl, hawk and eagle feathers in his war bustle were traded for at Pine Ridge.

The Lakotas are famous for the sun dance, a ceremony of self-sacrifice, marked by self-inflicted pain. "I personally have never danced the sun dance," says Goes In Center, "but it isn't pagan, as some people think. The Indians aren't actually dancing to the sun. It's just that we recognize that without it, nothing would grow. So the sun is probably the most feasible thing a person can look at and recognize the existence of a god. To the Lakota, the biggest sacrifice he can give is himself. Say a relative is sick. He may vow to do the sun dance, piercing himself with sharp sticks, if the relative gets well. It's his way of giving thanks."

Goes In Center moved across the room to choose a tape from his large collection of Indian tribal songs, many of which he recorded live. They are his favorite music, though he is also very fond of country and western.

"People don't always realize how diversified Indians are," he said, "or how religious. Their songs are invariably about god." In the Lakota dialect, that god is spoken of as *Tunkásila* (Grandfather God) *Wakan Tanka* (Great Spirit).

Sometimes, at Pine Ridge, Goes In Center takes part in a fasting rite. "You go through a sweat lodge, to purify yourself, and then you go on top of a high hill. You don't eat or drink for four days. But you pray, and you smoke the pipe, pointing it in four directions, and make offerings." Each direction has its own color, sacred to the Lakota: white for north, yellow for west, green for south and red for east. "The smoke from the pipe, going upward, symbolizes your prayers. When you come down, you pray again, with the medicine man, and go again through the sweat lodge. Then there's a service with your relatives, where you relate all the things that happened to you. And a big feast."

Kate arrives in her Audi. As small-boned as her husband is large, she moves with a willowy grace. Like him, she is a Lakota (the Indian name for what the French termed "Sioux"). Her blue eyes, she says, could have come from French forebears, but they might just as readily be an inheritance from her grandmother, a full-blooded Lakota who was carried on government rolls as "Sara Blue Eyes."

"When I was going to Antioch College," Kate recalled, "I majored in sociology. I never really perceived myself in a technical job. But I like it."

She excused herself to feed her chickens and keep an appointment with a contractor who had come to estimate the damage a hailstorm had done to the siding of the house. Then back again, to play with Natalie on the carpet.

"We named her Natalie because we like the name, and I discovered, in a name book, it means 'little one born on Christmas Day.' She was born on Russian Christmas. Then, too, Jhon's father is named Nathaniel. She'll be given her Indian name by her godparents."

Kate began to whistle softly. "Never whistle in the dark. It arouses the spirits," she said. "That's an Indian belief. Also, dogs barking means spirits are around. I said I don't believe such things, and yet I do."

A fasting rite lasts four days. When it's over, there's a service with relatives. And a big feast.

The season for dancing was past. Even so, the Goes In Centers said, every long weekend when their parents aren't visiting them, they put Natalie in the truck and make the 300-mile journey north to Pine Ridge. "I have a house there," says Jhon, "and some land inherited from my grandmother. Sometimes I wonder if I wouldn't be better off up there. You make more money down here, but you have to spend a lot, too. But IBM is a good company, and I wouldn't want to walk away from it."

Kate brought out the dress she wears for Indian ceremonies and a German silver concha belt. Both date back to the 1800s. "Grandma had the belt," she said, "and Jhon fixed the leather." She traded for the dress, which is made of trade cloth trimmed with copper with silver-plated sequins and dentalium shells. "The shells were traded from the Northwest Coast Indians," Kate explained, "and are now extinct." Her cape, of bright-colored tube beads, she received at a giveaway. A man was having a name ceremony for his son. "In Indian culture, when you are honored, your parents give away things in your name."

She made the tiny braid in Jhon's hair to enable him to hold his headdress on, and we went outside to take photographs with the horses—two Appaloosas named Cedar Bar Twist and Rosebud and a black, half-Appaloosa half-quarterhorse known simply as Black Filly. "We'd probably race them back home," said Jhon. "It's cattle country, lots of cowboys. My dad raises cattle. As it is, we may sell them or show them."

"Appaloosas have only been registered since 1939. Did you see the show on television about Chief Joseph?" asked Kate. "He and the Nez Percé Indians were supposed to go to a reservation, but they ran away toward Canada instead. Their Appaloosas could outrun cavalry horses, and they almost made the border, except the people were cold and starving. When Chief Joseph surrendered to the U.S. Army, the Appaloosas were killed or auctioned off. They're just now being rebred."

We asked if the Goes In Centers were involved in the Indian rights movement. "I was never a militant," Jhon replied. "But when I was younger, I did research and belonged to some organizations that presented facts and papers to educate people on what was happening to the Indians. When you are young, you think you can change the world.

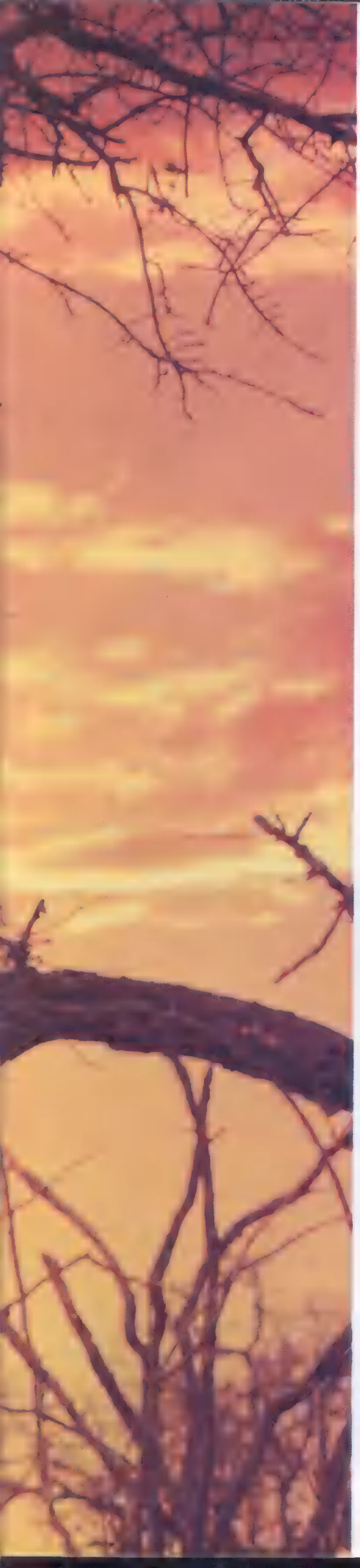
"I don't think there will ever be peace in the world the way we want it," he continued, "because somebody's always trying to prove they're a little bit stronger than somebody else. Always, in the back of my mind, for instance, I know that a long time ago, our tribe had really good warriors. But I'm sure there are other Indian tribes who feel they're the best. It's human nature.

"I like the white man's conveniences, and, of course, I was educated in a Christian boarding school, but I grew up with the traditional Lakota values. I want Natalie to know the best of both ways in her life."

On the way home, we couldn't help reflecting that her learning process has already begun. A Lakota calendar, in the Goes In Center kitchen, illustrates the wisdom, bravery and generosity of the Lakota men and praises *wolakota* (friendship) and *otakuye* (kinship) of such relatives as *unci* (grandmother), who is the "sinew of life." On the squares below, one date was remembered in handwritten English: It was the day of "Natalie's first blueberry sugar cone." □

'Our tribe had really good warriors, but I'm sure other tribes feel they were best. That's human nature.'

Natalie befriends Black Filly, while Rosebud, who foaled in January, looks on. Natalie's coat was made by her mother, Kate, shown at far right, in her IBM office. At right, some of Jhon's handiwork, including the head of a prayer pipe, made of pipestone.



Don't shoot the lions

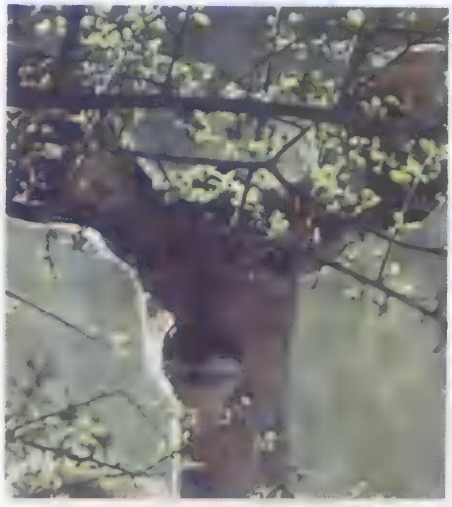
At Kruger, they've found a friend in the computer

by Harrison Kinney

Nearly every working day, a four-passenger Cessna, marked "IBM," takes off at daybreak from a small airfield on the high-veld. It turns east toward "the escarpment," as South Africans call the Drakensberg Mountains, which run 600 miles from eastern Cape Province in the south, far into the northern Transvaal. The mission of the chartered plane and its contract pilots is to fly an IBM customer engineer to 45 computer installations scattered throughout western, eastern and northern Transvaal, in mountainous, scrub and bush country that reaches to the borders of Mozambique, Rhodesia and Botswana. They land on 25 or so remote airstrips, most of them dirt that can suddenly turn to mud during one of the summer's unexpected and fierce rainstorms. The customer must meet the plane and drive the CE to the installation, sometimes waiting for the pilot to buzz the strip and clear it of animals before landing.

The territory is currently that of a tall, fair, good-humored man named Koos du Plessis, who agreed one day to take along a writer from the States.

Du Plessis was dressed neatly in a summer-weight black suit with white shirt, tie and highly shined black shoes. In his two years in the territory, he has logged more than 1,000 flying hours, averaging 12,000 kilometers a month. Though it was near the end of winter, the days were still short, and du Plessis could only get to five or six installations in one day of flying. The airstrips have no lights, and the plane must be airborne and headed home by sundown.



The 5-million-acre game preserve, only partly fenced in, contains a wealth of plants and birds. But the big attraction is what has been called "the greatest wildlife show on earth." The cast: everything from crocodiles and hippos to baboons and elephants.

Du Plessis lives with his wife and children in Verwoerdburg, a town in southern Transvaal. He put himself through a technical college, working and going to school three months at a time. He took a job with the national railways and then became interested in the computers his brother managed at an IBM customer location. He applied to IBM for a job and was trained as a CE.

From the air, one can see neat, giant blocks of green pine on the gray and tan veld below, "plantations" of fast-growing trees used for paper manufacture and for timbers that shore up gold and coal mine tunnels. Passage through the escarpment was the Blyde River Canyon, with smooth, molded, forested mountaintops high above the plane on either side. The climate had suddenly become subtropical.

Soon, the plane dropped toward a macadam airstrip, with a mobile home for a terminal. A herd of impala took flight at the plane's approach. This was Skukuza, headquarters for the famous Kruger National Park, the game reserve that runs

First buzz the landing strip to clear it of animals. Then make your customer call.

Top: Koos du Plessis, General Systems customer engineer, flies 12,000 kilometers a month to service 45 computer installations in scrub country bordering Mozambique, Rhodesia and Botswana. Above: ■ System/3 call.

from Rhodesia in the north, along the Mozambique border on the east. The park is as big as Massachusetts. It does a lively business, with more than 300,000 tourists a year renting guest camps and taking picture-shooting tours.

Income is more than 6 million rand a year (a rand is $1.18) and helps defray the park's annual budget of more than R15 million. The controller is a huge, ruddy man who was dressed in shorts and knee socks when he picked up du Plessis and drove him in a Volkswagen bus through scattering herds of antelope to the thatch-roofed headquarters buildings where a System/32 was to be upgraded to a System/34. Dust, he explained, is a frequent source of computer trouble.

The park budget, tourist administration and reservations are handled through an online System/370 Model 115 in Pretoria, headquarters for all the nation's parks. There was an attempt to hook up the park's eight campsites to Pretoria's computer, but some of the 8,000 elephants promptly adopted the new telephone poles, leaning against them to

The herbivores, such as antelope, left, and zebras, above, often graze together for protection against predators. One species may excel in sight, another in smell or hearing.

scratch their backs, and uprooting them. With the customer's level of satisfaction substantially below that of the elephants', the teleprocessing dream was abandoned.

The park computer is used by government zoologists and botanists to manage the huge herds of the most varied, interesting and beautiful animals in the world, all native to the area. The balance between the animals that graze and the predators is carefully watched.

"The animals used to roam free between the mountains and the ocean," says Peter Retief, a biologist who helped build a large ecological model of the park on the Witwatersrand University's System/370 Model 158, and is now building a smaller model on the park's System/32. "'Now, to protect the animals from poachers, we fenced in the border with Mozambique. The elephants, out of habit, kept plowing through it, followed by the giraffes, so we strung large steel cable. The elephants even tore down some of that, but they've finally decided it isn't worth the bother.

"The point is, we used to be freer to let nature take its own course here. Now, other considerations have forced man to interfere with the animals' habitat, and we have the responsibility to manage the game scientifically. We take aerial censuses of the animals and where they are. When the System/34 gets here, we plan a more complete model of the ecology. Why do communities of plants grow where and as they do? When should we turn off, or on, some of the 308 windmills that pump water into water holes? How

Planning location of terminals for the new System/34, du Plessis with Dr. G. L. Smuts, senior research officer at Kruger. Exhibits are of elements to be included in the new computer's model of the park's ecology.

large a population of lions can the park support at a given time?

"Before we got our first computer about 1970, we were making some bad guesses. Not long ago, the gnu—a large, ox-headed antelope—began dwindling in number. We suspected the lions and were about to reduce their number when the computer reported that the lions were losing population, too. It turned out that rival male lions were taking over the prides from other males and killing the cubs. Wild lionesses don't usually breed for two years after giving birth, but if their cubs are killed, they will mate prematurely. The new leaders of the prides presumably wanted their own offspring. So if it wasn't the lions, where was the trouble coming from?

"We built a gnu model on the computer and learned that recent rains had caused the grass to grow too tall for the gnu, which likes low grass for grazing. Furthermore, the tall grass was dividing them into small herds, making them easier prey for the hyenas, wild dogs, cheetahs and leopards that, like lions, need tall grass as cover to make a successful kill. We turned off some of the pumping, and that soon helped.

"The gnu is declining again at the moment, and because the lions are back in strength, we again suspected them. But the computer told us if we cropped the lions, it would lead to an excess of zebras who would destroy the grazing for the roan antelope, which is becoming rare and must be protected. We were next blaming the zebras for crowding out the kudu and other antelope, but the computer said it wasn't the zebras. We found a disease was spreading through the antelope herds, and we're now immunizing them by dart from helicopters."

Retief grew up on a farm just outside the park. "I always had a hankering to get back," he said, "but I got into scientific and commercial computer applications elsewhere. Then they needed computer expertise here at the park, and I jumped at the chance. It's important work, I feel. What we're finding out, with the computer to help us, is proving of value to wild game reservations the world over. In the old days, it seemed that the answer to almost everything was to shoot lions. Not now. The lions don't know what a friend they've got in the System/32."

More than 350 visitors come to Kruger each day, staying at fenced-in, well-equipped camps by night, driving the park's 1,250 miles of road by day. Visi-

A terminal network seemed like a good idea until elephants tore down the poles.

Customers must fetch and deliver du Plessis at the air strips. With no lights on the field, plane must be airborne by sundown.

tors must remain in their cars, drive no faster than 25 miles an hour and are subject to $1,200 fines and imprisonment for teasing or feeding the animals. The first nature foot trail was opened last year, enabling game spotters, photographers and students of bird and plant life to leave their cars, though the hikers remain under close supervision of park rangers. (The park has 216 rangers.)

The animals have come to show little fear of vehicles. Lionesses, the family providers, have been known to trot alongside a car, using it as a screen to get near their prey. The wary herbivorous creatures—zebra, buffalo, giraffe, gnu and antelope—have learned protection through communal action. Zebras, impalas and other antelopes often graze together because one species excels in hearing, another in smell, and another in sight, assuring all an effective warning system against the lions, leopards, jackals and wild dogs.

The grumpy-looking wildebeest, or gnu, often grazes with zebra, who drowse at night but are usually alert during the day. The gnu is most wide awake at night, and the two species spell one another as sentinels.

Neither hippos nor elephants can see well, and motorists are warned to turn their cars around and prepare to flee if one of the huge animals decides to charge in their direction. The elephants are the despair of forest conservationists. Unable to reach the tender buds at the top of trees, as the giraffes do, the elephant simply pulls down the tree.

The park is the namesake of Paul Kruger, who, as president of the Boer Republic of Transvaal, began his fight for the reservation in 1884, resisted all the way by farmers who wanted to develop the land, and by mining executives who wanted it as a hunting preserve. With a park system finally established in 1898, Kruger was opened to the public in 1927 and is considered one of the best-managed wildlife sanctuaries in the world.

Du Plessis stores 2,080 spare parts around his territory. This readily available inventory keeps his schedule flexible. On this day, he was able to service computers at three widely separated administrative centers.

The huge red African sun was already bisected by the horizon as the pilot took off from the dirt runway at Giyani, capital of Gazankulu, where du Plessis had brought an ailing System/3 back to health. It was dark almost immediately.

Rings of fire lit the mountainsides, some clearly out of control as farmers, trying to clear the land, found the foliage too dry from the winter's drought to manage. Two hours later, du Plessis was back at the plane's home airport. It was nearly 9 P.M. when he got into his car.

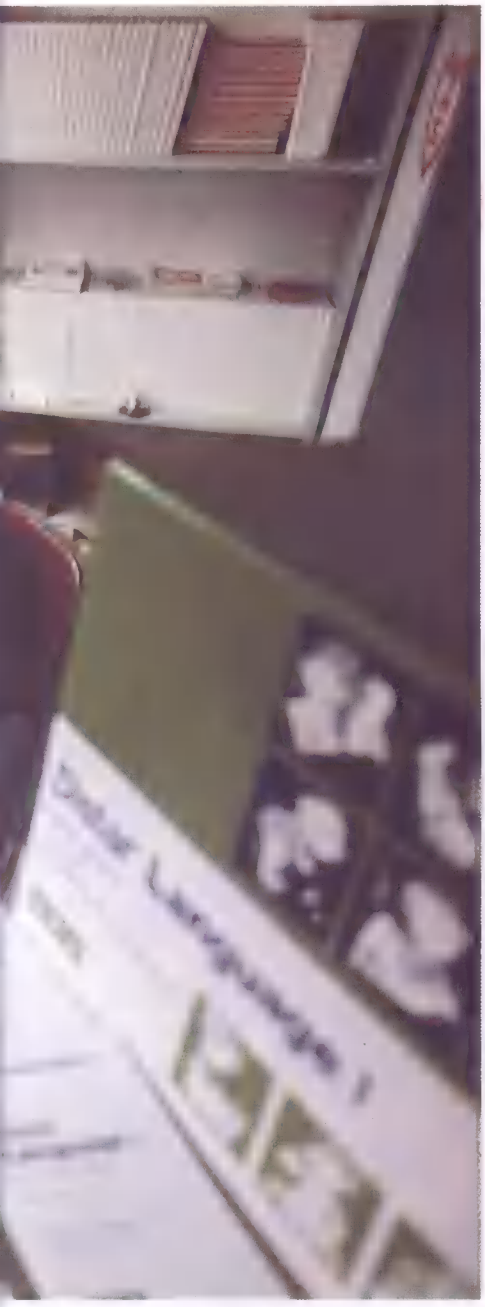
Did he ever weary of the routine?

"No, for the very reason that it's not routine," du Plessis replied. "The territory is in a kind of learning mode. Zoologists learning about animals. Students learning in universities.

"When you're needed every day for worthwhile things, you don't get tired of the work. That's why I'll be back here tomorrow morning with a smile on my face." □

Goodbye to bad grades

Any child can learn when teachers teach the Distar way.



Teacher Glenna Best works with her first graders at Whitesville Elementary School in Moncks Corner, S.C. Low reading scores in that county have improved dramatically.

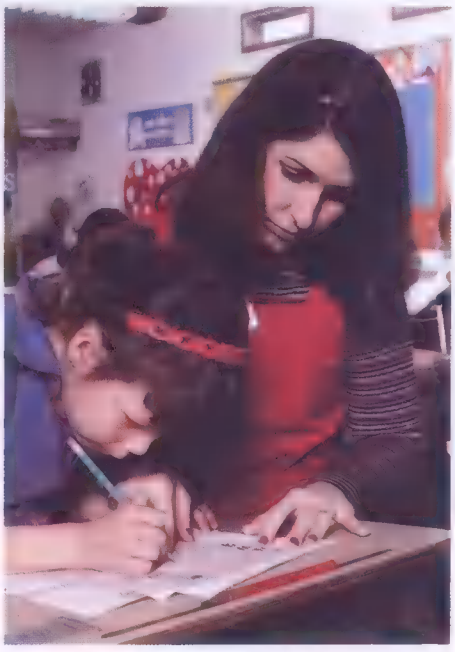
by Patricia Brooks

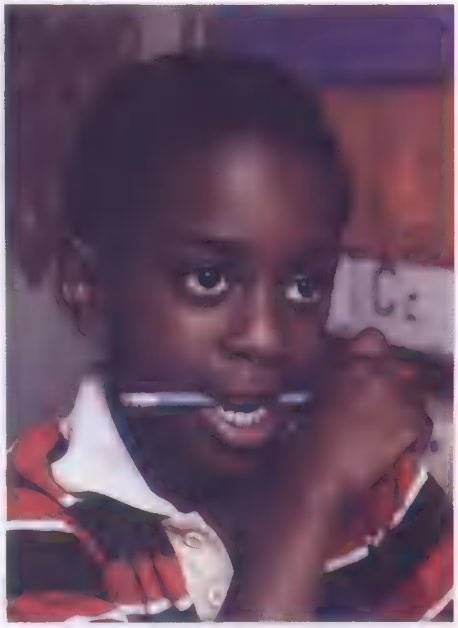
"I've never been too bright until this year," said 13-year-old Sandy. "Now I read to my nieces and nephews, and I'm teaching my two-year-old niece to write her name."

Nine-year-old Michelle's face exploded in a grin. "My older brothers can't believe it. 'Wow! She can really read!' I read better than they do."

What has generated this kind of enthusiasm are academic programs called the Distar® Instructional System and Corrective Reading—direct instruction methods of teaching arithmetic, reading and language to children who had previously failed to learn. The results in the 10 years since the Distar program's introduction by Science Research Associates have been extraordinary.

What makes the Distar system so special is deceptively simple. The program operates on the premise that all children can learn if properly taught, but that, in order for children to learn, a teacher must teach.



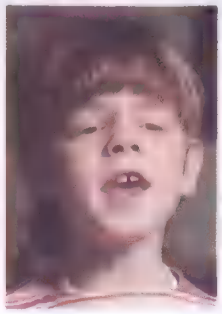


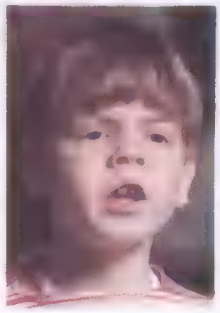
(Above) Seven-year-old Eric Shawn Simmons is all business. (Below) Mrs. Best works with Lisa Varner on the all-important "take home."

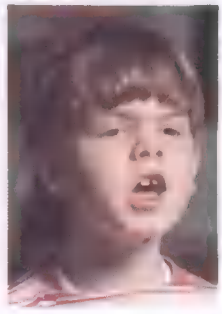
Sounds simple, right? But in the view of Siegfried Engelmann, professor in the Special Education department at the University of Oregon, teachers do *not* always teach. That has been a major reason why Johnny has not learned reading—or much of anything else. According to Engelmann, one of the developers of the Distar method, teachers all too often apply "a floating standard" or labels to excuse their own unwillingness to teach.

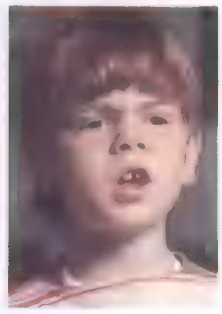
"You know the labels," says Engelmann—"learning problems, perceptually handicapped, visually impaired, immature. They allow teachers to become 100 percent insulated in every kind of situation. They never have to look at what they

Patricia Brooks is a freelance writer and frequent contributor to Think, *as well as to numerous other magazines.*









Recess at Whitesville. Even scholars have to let off steam sometime.

did with those children because they can always write them off on the basis of individual differences and inabilities."

The Distar program makes no initial assumptions about what a child knows or doesn't know. At the beginning of a school year, children are given placement tests for reading, and then assigned to groups of from five to ten students—usually no more. Based on individual progress, the groups are reorganized every five or six weeks. Small groups are basic to the program's success.

The system relies heavily on repetition, demonstrations, immediate feedback, positive reinforcement and drill exercises. The pace in the half-hour lesson is steady and swift. The Distar method has been called "verbal bombardment" because the teacher functions with written instructions (a script), from which there is almost no deviation throughout all 160 lessons.

There are three Distar programs—reading, language and arithmetic—and each is divided into three levels, usually for children in the beginning three primary grades. The material to be learned has been analyzed and broken down into a series of learning objectives. These objectives, in turn, have been developed into small teaching steps or tasks and placed in a logical sequence for rapid teaching.

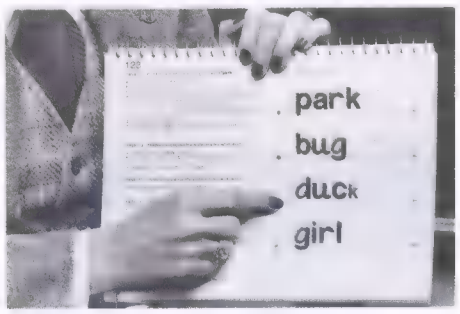
"Often a child does poorly in school because the teacher *assumes* the child already has some skills—or can understand and follow instructions given in the classroom," explains Donna J. Granat, SRA product manager. "With the Distar system, on the other hand, the teacher assumes *nothing* about what a child already knows."

When national studies revealed the appallingly low level of children's reading, especially in inner city and rural schools in the mid-1960s, it was widely realized that something had to be done—and fast. Head Start, then Follow Through, were federally funded projects aimed at correcting this situation. The Distar system was included as one program that might help.

In 1969, SRA became officially involved as publisher of Distar materials. When SRA was founded in 1938, its goal was to use the principles of the behavioral sciences to improve career guidance and counseling. It soon expanded into testing activities in elementary and secondary education.

In 1957, in an attempt to help teachers meet the needs of students with differing learning rates, SRA published its landmark Reading Laboratory® Kit. After becoming a wholly owned IBM subsidiary in 1964, SRA continued to expand its testing activities and its programs in reading, mathematics and social studies.

Interplay between teacher and student is at the heart of Distar. Virginia Polk works with first-grader Ricky Jackson (also in top panel) who seems almost to taste what he's pronouncing.



Script book. Teachers soon master instructions on the left, so things move quickly.

Publishing and marketing the Distar system seemed an SRA natural. Since then, its sales representatives and consultants have instructed more than 60,000 teachers in the Distar method. The programs are in use throughout the United States, Canada, the United Kingdom, Australia, Guam, Micronesia, Japan and other countries. More than one million elementary school children have learned to read with the Distar program's help. Richard Giesen, president of SRA, calls the program "a standard bearer of what the best in education can be."

Not all educators agree. Proponents of the open classroom approach usually consider the Distar approach too structured, too regimented. They stress that children first need a good self-image in order to learn. The Distar belief is that children who achieve academic success *then* develop a good self-image.

Results seem to speak for themselves. Recently, a massive nine-year study, funded by the U.S. Office of Education, but independently researched, observed the development of 9,200 children from kindergarten through third grade, who were participating in various Follow Through program models in 139 cities. Of the nine different approaches used, the Distar method proved the most successful. It outperformed all others in basic skills and self-image measurements, and it established that compensatory education can make a difference.

Particularly telling are the results in reading and math skills at two schools in Washington, D.C., where the children come from similar backgrounds. At one school, the emphasis in teaching has been on freedom of choice, with reading and math taught in a variety of ways in informal, open classrooms. At another, the teaching method has been the Distar system. At the first school, third-grade reading and math scores were at the 12th percentile, while at the school using the Distar program, reading scores were at the 35th and math scores at the 56th percentile.

Recent visits by this writer to three completely different locales revealed firsthand what dozens of evaluation studies only suggest.

In Chicago, the Distar method is introduced to three-year-olds in five of the inner city's 26 child/parent centers. At age four, the children are ready for Distar Reading I. "The ability of these tiny kids to sit still and do the seat work required by Distar amazes me," said one teacher. "I'd expect it in first or second grade. To find it so young is exciting."

The Distar program, it had been explained before our visit, is taught in a structured pattern. The teacher is trained to: elicit responses in unison from small groups of children to provide maximum practice for each; ask questions freely; concentrate on whole groups and individual children's responses, being sure that each child gets to respond many times each period; avoid rushing an answer; praise correct answers and avoid criticism; give short explanations with examples familiar to the child.

Each lesson is scripted, but, surprisingly, this isn't apparent to an outside observer. The lesson moves along so fast, there is such interplay and support between teacher and the small group, that spontaneity creeps in. Young as they are, the children are riveted to the teacher's questions and comments.

"Sit tall, feet together, hands in your lap," Mrs. Michele Jones tells her three-year-olds as they begin their day's Distar Language lesson at the Ferguson child/parent center.

Mrs. Jones encourages a group response. She points to a picture of an egg and asks, "What is this?"

"An egg," the children respond.

"Say the whole thing. 'This is an egg.' "

"This is an egg," they answer.

This type of question and group or individual response continues through the 20-to-30 minute lesson, giving the small group of youngsters many chances to learn and to have their new learning reinforced.

Later, as the lesson ends, Mrs. Jones says, "Let's clap our hands because you did such a good job."

Each child is given a "take home," a page of work relating to the day's lesson and reinforcing the classwork. The child is supposed to review it at home with parents—a critical ingredient in the Distar program.

"This is sometimes a problem," a teacher confided. "At a central city school, many parents are teenagers themselves and don't always realize the importance of their kids' learning."

Mobility is not a problem in Moncks Corner (population 2,500), county seat of rural Berkeley County, South Carolina, near Charleston. But low reading scores were. "Then we heard of Engelmann's approach to reading," Dennis Cox, Title I coordinator for the county schools, explained, "and we knew that's what we wanted even before we knew SRA was marketing it."

With a school population of 20,000, the county has used the Distar program for the past three years in four of its eight Title I elementary schools. (Title I is the name for one of many federally funded school programs.) "The children in those four schools made more progress than we could ever have anticipated," says Cox. "We were so pleased that last year we put Distar into all eight schools in grade one, with plans to increase it. It's now in grades one through three. We also use Corrective Reading in grades four through ten."

Corrective Reading, an outgrowth of the Distar system, is a relatively new SRA product, introduced in 1976 for grades 4-12, to help poor readers in upper grades improve their basic reading and language skills.

At Berkeley High School, Mrs. Caroline Bryant led a class of 14 boys and girls through a Corrective Reading lesson. They listened and responded intently to her easy, natural-sounding questions about words and sentences. Some followed each sentence being read with pencils trailing along the text.

After class, Mrs. Bryant said: "As far

When the lesson ends, Mrs. Jones says, 'Let's clap our hands because you did such a good job.'

as I'm concerned, Corrective Reading is *it*. It's very controlled, but, at the same time, it's more individualized. Reinforcement is constant. It builds word accuracy, speed and comprehension. It could benefit every student in this school."

Her students share her enthusiasm. One boy, Paul Pou, age 16, said: "One time, I didn't like to read at all. Now I take a lot of books out of the library. I'm doing better in my other classes, too. I used to make 70s in Social Studies. Now I make 90s."

Dennis Cox attributes much of the program's success to SRA support: "They're the finest group of representatives and consultants I've worked with over the past 10 years, from the local sales person right up to the Atlanta office."

James W. Hinson, Jr., principal at Whitesville Elementary School, noted: "These kids average out to the bottom quarter of their class. Now they're experiencing success for the first time in their lives."

Watching first graders in Mrs. Glenna Best's class, one finds the attention and enthusiasm almost tangible. Responses were quick and to the point. There was no wriggling, squirming or daydreaming. "That's because they're so involved," Mrs. Best explained later. "In regular textbook programs, it takes a long time to get results. With Distar, there's instant feedback. And the retention is better than in any program I have used."

In Bridgeport, Connecticut, a small city with all the problems endemic to a larger urban area, the Distar system has been used since 1970. It is now used exclusively in kindergarten through grade three throughout all the city's Title I schools. Judy Hurle, director of early childhood programs, is an advocate. "I wish I'd had Distar when I was teaching in Michigan," she says. "I can think of students I didn't reach who could have been reached with this program. We have students in second grade who are already reading at a third-grade level."

Distar banks heavily on the involvement of parents. Mrs. Best looks over the "take home" Dawn Simmons has shown her parents.

Even with the same script, the Distar system teachers can inject their own personalities into the lesson. Some are straightforward, some playful, some dramatic. Ms. Pat Sorrentino, who teaches Distar Arithmetic to a second grade class, has the instincts of a cheerleader.

"Ms. Sorrentino is going to touch the number, and you repeat it." She does, they do, and she says, "Good!" or "Hurry up!" or "Everyone who does not make one mistake gets a sticker." She touches, gestures, moves around to inspect each child's work sheet.

Later, she confides: "Learning by rote can be boring. But Distar, though repetitive, is always interesting. The children are already on fractions. In most math programs, they don't get fractions till third grade. The Distar vocabulary is simple, and the program indicates where the students are likely to make a mistake, so I can correct it right away. I also like the way the kids move from group to group as their skills warrant."

To date, the Distar system has been used most widely in urban and rural schools where the school populations might be termed socially disadvantaged. Yet, experiences at a Chicago school, Ogden, prove that the program works well with all children. Ogden's students represent a mix of affluent youngsters and others from a deteriorating neighborhood nearby. Second-grade reading scores of Distar program students averaged 4.1. The national average is about 2.8, and about 2.2 for inner cities.

As the philosophy of back-to-basics, no-frills education takes root, the Distar system may be a program whose time has come—nationwide. It is already in place throughout the entire school systems of Mount Vernon, N.Y., and Glendale, Calif.

Finally, there's this proof-of-the-pudding story from Mrs. DeAnna Trout, an aide in the Distar Language program at the Berkeley Elementary School: "I ask them to use each new word at home for positive reinforcement. One boy came to school and was so proud. He told me, 'I used the word "absurd" yesterday. I told my brother that if he put the front tire on the back wheel of his bike, it would be an absurdity.' " □

update Federal Systems Division

An interview with John B. Jackson, president of the Federal Systems Division. Jackson joined IBM in 1954 and moved to FSD three years later when it was still called the Military Products Division. He became FSD president in 1969.

Q. Next year, FSD will be 25 years old. What are the most notable changes you've seen?

A. When Military Products was formed in 1955, we were developing the B-52 bombing/navigation and SAGE air defense systems. It wasn't until the late fifties that we began to expand our program base and to compete actively for defense contracts. That was an important transition. We had to learn how to become part of the competitive and sophisticated world of defense contracting.

Then, in the early sixties, we began our involvement in space activities. Working on the Apollo program to put a man on the moon strengthened our discipline in developing demanding hardware, software and systems integration capabilities. That, coupled with our earlier reputation, gave us the credentials to compete for increasingly complex programs.

When the space effort began to tail off in the late sixties, we faced a difficult situation. We had devoted half our resources to space. Meanwhile, in defense, the emphasis had changed from reliance on strategic systems to greater emphasis on general-purpose forces and tactical systems. The division responded by developing the System/4 Pi computer family. It enabled us to compete across a very broad area for avionic type equipment. We learned how to manufacture competitive products in volume without sacrificing high quality and reliability. The product helped bring us economic stability. We recently delivered our five thousandth 4 Pi computer.

Since the mid-sixties, we have consciously tried to broaden our contract base. An example of this is our entry into sonar with the development of the Navy's first digital sonar system.

Q. Does FSD have a single, most important program today?

A. No, we do not. We have a number of programs that are key to the division's health and to the defense or space effort we are supporting. The Department of Defense has a number of high-technology programs that are very complex and difficult to manage. These are the types of programs where we believe a company like IBM is needed and which, in turn, make sense for us to be in.

Q. Could you give an example?

A. The LAMPS program is one. Because integration of the electronics system is so key to performance, FSD was selected as the system prime contractor. This is a departure from the Navy's traditional practice of selecting a shipbuilder or aircraft builder as its prime contractor. The purpose of LAMPS is to extend the eyes of a surface fleet so that it can take proper action before it is attacked. We don't build the ships or the helicopters that fly as search aircraft from them. Our job is to integrate a set of very complex electronics gear on both a ship and a helicopter into an effective weapons system. The program is vital to the Navy's surface strategy.

Q. How important is it that FSD is an integrated division that develops, tests,

manufactures and markets its own products?

A. It's critical. To satisfy our customer, we have to be able to change directions quickly. That means we have to have a tight coupling between marketing, engineering, manufacturing and support people. You have to have all functions represented and push coordination among them down to as low a level as possible. We've done that throughout our various business areas—in avionics, shipboard, command and control and space activities.

Q. A frequent reason given for engaging in space and defense programs is that advanced development work from these fields can technologically benefit the rest of a company. Does FSD attempt to play such a role?

A. It is difficult to consciously select programs and directions that might have benefit for the rest of the corporation. Things just aren't structured that nicely. With that said, a number of important developments have come out of FSD. For example, the 3838 Array Processor used in petroleum exploration came directly out of our advanced signal processing work for Navy acoustic processing systems. Structured programming came directly out of the disciplines we were developing and pushing to meet our business needs. A lot of our experience on real-time programming systems has gone directly into commercial applications.

Now we are beginning a new effort to strengthen our precursor role by coupling our advanced component development facility at Manassas with the Research Division. Where Research has been able to explain phenomena and has built experimental devices, we will try to apply them for the Department of Defense. For example, we plan to take one of that division's processors called the Research Signal Processor and apply it to our needs well in advance of any known commercial applications.

In another area, we are beginning to work with Research in gallium arsenide. This material is very promising for the RF [radio frequency] circuit work we are doing in Owego. In addition, the material may have a future in solar energy.

We have plans to work with Research and the Data Systems Division on submicron lithography in order to produce very large-scale integrated circuit chips. This joint effort could be a very meaningful development for the whole corporation.

Q. How would you compare the Space Shuttle program with Apollo?

A. With the Apollo program, President Kennedy stood up in front of 200 million people and said that we were going to the moon within the decade. That kind of thing just doesn't happen very often.

While probably far less dramatic, the Shuttle program poses an equally important question: Can this space environment, which we have only begun to explore, be put to practical everyday use? The Shuttle is a relatively low-cost approach to putting people and equipment into space, doing useful things there, bringing them back again, and then being able to reuse the space vehicle. It has very challenging goals in reducing costs from the level of the Apollo program.

NASA is betting a great deal on a genuine economic payoff through a whole host of projects they believe humans can do advantageously from space. These range from such routine operations as orbiting and repairing satellites and earth resources exploitation, to research in medicine, manufacturing and astronomy.

The Shuttle program can be very important to the nation. But many of its benefits are still to be spelled out.

Q. How do you feel about taking part in such high-visibility programs?

A. That's part of the real excitement of this division. And, to me, it's part of the reason why we have an FSD. Of course, our people agonize through all the risks, but they seem to thrive on a demanding environment. People say, "I'm part of an important thing. I enjoy what I'm doing. I make a difference." Our people feel and worry about that Shuttle just like the astronauts do. And that's true for a lot of the programs we're in.

Q. Is it getting more and more complex to do business with the Federal Government?

A. Each year, there seem to be more

The division at a glance

The 11,000 employees of the Federal Systems Division provide information-handling systems to the Federal Government. The systems are developed for seaborne, spaceborne, airborne and ground-based environments. While in its early days FSD was primarily a contractor to the Air Force, it has, in recent years, expanded to become a major supplier of Navy sonar and antisubmarine warfare systems. In addition, FSD has been a major contractor to NASA since the nation's space program began, and today is playing an active role in the Space Shuttle program.

The division, which is headquartered at Bethesda, Md., has major facilities at Gaithersburg, Md., Manassas, Va., and Owego, N.Y. However, FSD employees are apt to be found almost anywhere—engaged in sea trials aboard the cramped quarters of a submarine, preparing for a space vehicle launch from Cape Canaveral, developing programs to monitor space flight from Houston, and at military installations in the U.S. and overseas.

Sonar and antisubmarine warfare systems now account for a significant part of FSD's business, and it's all happened in only nine years.

constraints placed on the contractors, with the Government getting more involved in the day-to-day decision process. The Government is not a single body headed by one person. It's a whole host of independent forces. Even though the Department of Defense is our principal customer, it is made up of many individual components and each has to interact with other agencies. This makes our environment extremely complex.

Q. One reason we give for being in the space and defense business is to serve the national interest. But how do you tell what that is? For example: the President may be against building a new bomber, Congress in favor of it, and a large segment of the public for spending the money for something else, such as housing.

A. We have always taken the position that we do not become involved in setting or influencing the direction of national security policy. But, once policy has been established through the democratic process—by debate in Congress, debate between Congress and the President and public discussion—then we support the policy and the programs necessary to implement it. We believe that a company like IBM, with its technical and management resources, should support the Government in the critical things it is doing. □

Where does FSD's business come from? In 1978, a significant part came from antisubmarine warfare or sonar systems. The rest was divided among aircraft systems; space activities; command, control, communications and other programs.

Opel in South Africa

During a five-day visit in March, IBM President John R. Opel got a first-hand look at IBM operations in South Africa. He met with employees, customers and community leaders in Johannesburg and Cape Town. Opel, right, is shown with Fred Ingarfield and Leonard Mosala, who are involved with IBM's efforts to improve black education by using audiovisual devices to supplement teachers' lessons.

Teng's visit recalls another

Only twenty years ago, it was Khrushchev barnstorming the U.S. to San Jose

The historic visit of China's Deputy Prime Minister Teng Hsiao-ping to the U.S. in January brought to mind, for many, a similar precedent-shattering visit nearly 20 years ago by Nikita Khrushchev, the first Soviet leader to visit the U.S. A retired IBM engineer recalls the day that Khrushchev came to the IBM plant at San Jose.

Settled in a comfortable mobile home outside Leesburg, Fla., Nicholas N. Kadick fills his days writing magazine articles, playing an occasional round of golf and taking part in the programs of the Mount Dora Kiwanis Club.

But once in a while, the 65-year-old former Poughkeepsie procurement engineer, who took early retirement from IBM in 1971, thinks back to a day almost 20 years ago when a squat, nearly bald man, dressed in a light gray suit and white cap, emerged from the depths of a black limousine and stood blinking in the brilliant California sunlight.

It was September 21, 1959, the day that Nikita Khrushchev, then chairman of the Council of Ministers of the Union of Soviet Socialist Republics, had stopped by to see a typical American plant in action on a cross-country visit to the U.S. It was hoped that the journey would lead to improved relations.

Until a week before, Kadick had known nothing about the precedent-shattering event. Then, suddenly, the engineer, who had emigrated to the U.S. from Russia at the age of 13, was asked to come down from Poughkeepsie to IBM headquarters in New York City to be tested on his facility in Russian. Because his wife was not Russian, Kadick explains, he had had little opportunity to speak the language at home; however, he had kept up some knowledge of the language through the daily reading of Russian-language newspapers. Enough, so that the following day, Kadick, along with 15 other Russian-speaking IBM employees, was whisked to San Jose by plane.

"We spent every morning going through the manufacturing operations and translating each step into Russian," he recalls. "Then we gave each other dry-run tours through the plant—over and over again—until we became quite conversant with the whole thing."

The Russian leader, who had come to see a U.S. plant in action, is welcomed by Thomas J. Watson, Jr.

On the big day, Kadick was waiting in the foyer of the Education Building, where the first briefings were to be held. Chairman Khrushchev was led in by Ambassador Henry Cabot Lodge, President Eisenhower's personal representative, who served as host during his tour of the United States.

"Khrushchev nodded to me briefly," recalls Kadick, who was standing 15 feet away. "Then a middle-aged man in a conservative business suit glanced at the tag on my lapel and pronounced 'Nikolai Nikolayevitch Kadick,' speaking pleasantly in familiar, soft, homey Russian.

" 'I am very happy to be acquainted with you,' I replied, politely. 'You are with the Khrushchev group of course?'

"A gray haired man who was with him smiled at me indulgently. 'Mr. Menshikov is the Soviet Ambassador to the United States,' he corrected me.

" 'You are *also* with the Russian group, then?' I said, trying to overcome my embarrassment.

"The two men laughed.

" 'Meet Mr. Llewellyn Thompson,' said Menshikov, 'your own ambassador to the Soviet Union.' "

Following the briefing, the party went on to the cafeteria, where the Russian leader eagerly loaded and carried his own tray. Following the menu boards printed in Russian for the occasion, Khrushchev chose orange juice, onion soup, fruit salad with whipped cream, chicken and french fries in a basket. He asked for black bread—dark brown was supplied. Later, at Ambassador Lodge's suggestion, Khrushchev ordered a piece of cherry pie and dispatched it with a flourish.

In a speech following lunch, Thomas J. Watson, Jr., then IBM president and chief executive officer, noted that his guest was interested in speaking to production people in the United States. "Here in IBM San Jose," said Watson, "we have hundreds of such people . . . They can speak far more clearly about the results of our system than I can."

Khrushchev replied, "We each believe our system to be better, and it is only life that can show which one of us is right."

Then it was time for the plant tour. "It wasn't like an ordinary plant tour," says Kadick, "where four or five people are assigned to a guide and everyone knows what he is doing. It started as sort of a mob scene, because most of the visitors wanted to stay as close to their leader as possible."

At the luncheon, Khrushchev had thanked Watson for the "thoughtful gesture" of providing Russian-speaking guides. Then, turning to the guides, he had said, "Don't ever forget that once you are a Russian, you are *always* a Russian." The remark, Kadick notes, "was pretty unsettling to those of us who still had relatives living in the Soviet Union."

A few days after he returned to Poughkeepsie, Kadick was visited by two members of the F.B.I., who left a phone number, along with strict instructions to use it day or night in case he was contacted by a foreign agent. "My wife and kids were quite impressed," he says, "but nothing happened."

—GEOFFREY D. AUSTRIAN

The sky above the earth below

Madrid's scientists are looking at both these days with an eye to the future.

by Ed Grimm

Whenever they talk about having an image problem at the IBM Scientific Center in Madrid, it has nothing to do with the center's reputation—which happens to be impeccable. It has to do, rather, with some momentary bafflement in the processing work being done there on images of the earth originating 570 miles out in space.

That's where two Landsat satellites are busy these days cluing in the world's scientists on some much needed information. The Madrid center is significantly involved with the effort—a role that is much to its liking.

"We always try to be a bit ahead of what is being done by others," says José Luis Picon, manager of the center. "We want to be on the frontier, so that we can pull forward the other institutions."

The processing of Landsat images is one such frontier—and a critically important one for a world learning none too soon to be miserly with its natural resources. Fourteen times every 24 hours, the two satellites circle the globe, scanning, measuring, collecting and sending back a much-sought-after overview of the planet.

During each scan, the satellites record earth data for four different parts (or bands) of the electromagnetic spectrum. Detectors sensitive to these different bands convert the reflected radiation from the earth into a numerical code. Signals are then relayed to earth and recorded on tape at receiving stations. The tapes can be analyzed in various ways by computer to produce photo-like images in black and white or color.

Landsat, in a very real sense, has put the Madrid center on the map. The work there has been covered extensively on television and in the press. It has brought much recognition and many visitors. "There was a time," Picon remembers, "when it was we who had to look for the projects and the people to work on them. Now it is quite the opposite."

Created in 1972, the center is one of nine such IBM facilities in Europe, Asia and Latin America. It has settled in productively at the Universidad Autonoma at Canto Blanco (white stone), an embryo city outside Madrid, where 25,000 students pursue degrees in science, law, economics and the humanities.

The center, which occupies two floors of one of the university buildings, has a staff of 30 scientists and 5 administrative people. Fully half the scientists have doctoral degrees. The staff is young ("I'm the old man," says Picon, "and I'm only 35."). Most join directly from a university—either in Spain or the United States. And they have joined largely because of what they have heard about the place.

Picon is "tremendously happy" in his job. "I feel that we are doing much good for IBM and also for my own country," he says. "We are a bridge between the company and the needs of society."

He is an intense, quick-witted *Madrileño* who received his degree in engineering at the University of Madrid and a Ph.D. in electrical engineering from Virginia Polytechnic Institute. He has been manager of the center for three years now, but still considers himself primarily a scientist—"a scientist with a lot of administrative work." He skis, jogs and hikes in the mountains. And he reads just about everything—including poetry, detective novels and, recently, a translation of Joyce's *Ulysses*. "It was done excellently by a Spanish poet," he says, adding that, in true scientific fashion, he "confronted" the text often with the English-language original.

"Spain has come far in data processing knowledge as it applies to business," Picon believes, "but we lag behind in computer science research. I suppose this is the natural sequence, but we are now at the point where there is real interest on the part of the universities in welcoming computer science. Now, especially because of projects like Landsat, I believe it will grow tremendously."

One would be hard put to find a better example of international cooperation between IBM scientists than Landsat. Image processing has not only brought the Madrid center into contact with IBM's scientific center in Mexico City, but with colleagues in Norway and Egypt.

After a crash course in Norwegian, Roberto del Llano went to Oslo last year to help the IBM scientists there get a project under way in collaboration with the Norwegian Polar Institute. Blessed with a potential surplus of hydroelectric power from the melting snows of spring and summer, Norway needs to know how much to plan on. The idea is for satellites to obtain images of snow-covered mountains and, through image processing, build up a picture of snowfall patterns and expected water runoff.

In Cairo, meanwhile, water is also on a lot of minds. Authorities there are seeking a mass of geological information on a remote region known as the Tushka Basin. The aim is to see if it sizes up as an auxiliary reservoir to Lake Nasser. Here again, Madrid is helping. Satellite images, filtered by special computer algorithms, will be used to study the geology of the basin.

Back home, Landsat data is moving forward a geological study of the Campo Arañuelo Basin at the west end of the Tajo Basin in central Spain. "We hope," says Manuel Rebollo, who heads up the image processing work at the Madrid center, "to find out about the geological history of the entire Tajo Basin. Landsat is helping us display major geological

Students at Universidad Autonoma help check on how plants are doing in the hydroponic greenhouse. They grow there under controlled conditions and without the need for fertile soil.

features like faults, folds and basin boundaries. Some of the results could never have been obtained from fieldwork or aircraft photographs."

Rebollo is a curly-haired, quick-to-smile man who is fond of Bach and scuba diving. He is a native of Huelva in Andalucia and has a degree in aeronautical engineering and two graduate degrees, both in aeronautics, from Caltech. At the center, he has worked on pattern recognition for a vegetation map of the Ebro River delta and has applied image processing to the study of rocks (petrology) and composition of viruses.

Much closer to earth than Landsat's oscillating mirror and telescope—on the roof of one of the university's buildings, to be exact—another project of the center is under way. This one involves a hydroponic greenhouse, so called because it allows plants to be grown without the need of fertile soil. Plant roots rest on an inert medium, which is there merely for support, or are submerged in a liquid medium. Nutrients come from an aqueous solution. It's an ideal laboratory for experiments under controlled conditions.

A set of sensors installed in the greenhouse sends data to an IBM Series/1 computer. Climatic conditions can be varied through devices like heaters, ventilators and humidifiers. The goal is to know more about the critical chemistry between climate, plant nutrition and the physiological behavior of plants.

The experiment could lead, eventually, to a semi-automated system of computer control for large greenhouse complexes. There is no better way than a greenhouse, say agronomists, to grow plants and crops in regions with scarce water or inadequate soil.

Two men deeply involved with the greenhouse project are Pedro Armisen, computer science manager of the center, and Professor Octavio Carpena, head of agrochemistry at the university. Professor Carpena is president of an international society of citrus experts and is largely credited with the dramatic improvement in Spanish lemons—brought about by the repeated, rather than one-shot, administering of nitrogen.

"Whenever a plant has a deficiency in one of its 17 essential elements," Professor Carpena points out, "whether it is iron, manganese or zinc, production is affected. We need an instrumentation to measure this. The computerized greenhouse is that kind of instrumentation.

"We should be able to give plants what they need at each moment in their life. The only way to do this is by introducing the computer to measure those needs.

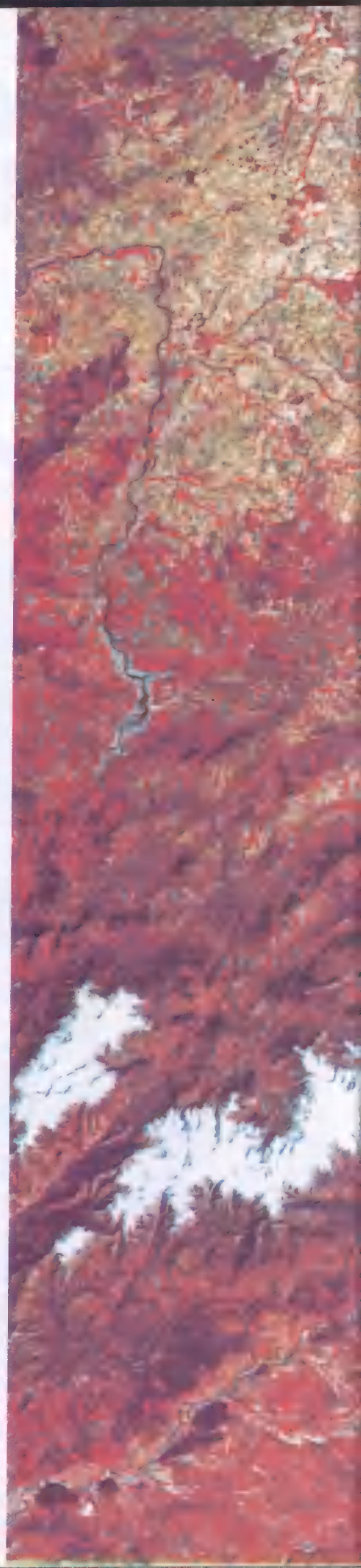
"And the beauty of it is that the results can be applied so quickly."

Armisen is equally sanguine. He is a low-key, soft-spoken man from the region of Aragon, fond of fishing for black bass and playing South American guitar music. Head of a group that also works on interpreter writing and decision support systems, he is a mining engineer with degrees from France in hydrogeology and geochemistry.

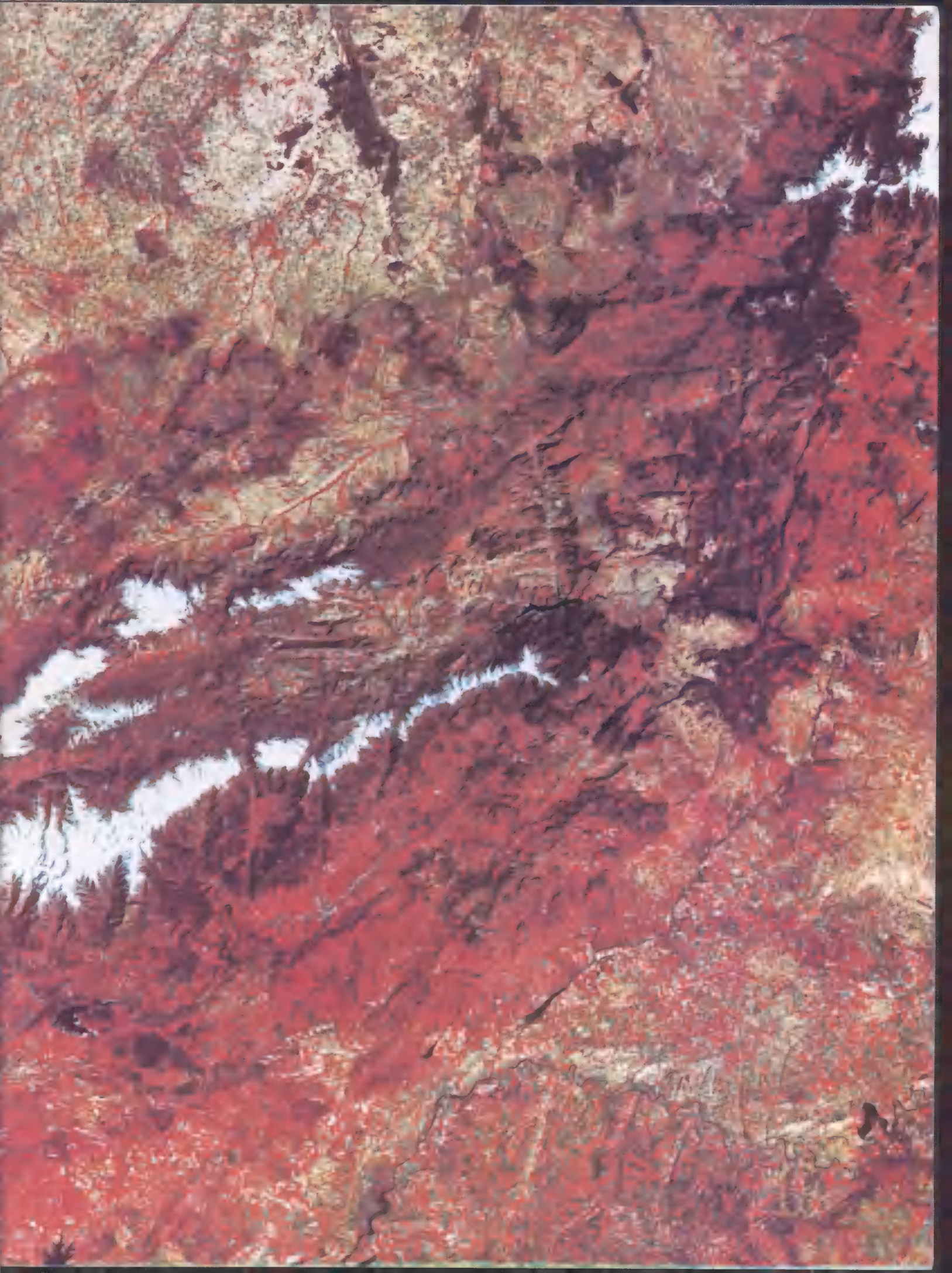
"We want to find out," he says, "how a given combination of temperature and humidity, for example, affects a plant's absorption of different nutrients. By changing the program, we can reproduce any number of climates. Among other things, this should help us know which fertilizers—which are very expensive to import—are needed in our country.

"It should also be possible to obtain plants with a higher content of substances of medical interest."

Armisen and his staff are also using applied mathematics techniques to help



Landsat view of the region around Madrid, whose extreme western section is just about visible at middle right. Other features shown are the Sierra de Gredos Mountains, the Tajo River and the city of Toledo.



Spain's Agricultural Ministry support agricultural development in Andalucia's Guadalquivir Valley and Murcia, renowned for its citrus orchards. The government wants to create 50,000 new hectares—a hectare is 2.47 acres—of farmland here by transferring water from the Tajo River to the Segura River.

These agricultural projects have put the Madrid center in touch with the IBM scientific center at Haifa in Israel. It's a good connection. Israel is looking to boost the productivity of its kibbutz farming system, and Spain is anxious to have progress on a wide geographical scale. "We can help each other," says José Luis Picon. "After all, a region is nothing more than a set of farms."

Those projects of the Madrid center that deal with natural resources couldn't be more timely. It's estimated that, in the next 25 years, the world's available crop-growing land per person will drop to barely half of what it is today. And, by century's end, expanding cities and suburbs will claim at least 60 million acres of prime crop land—an area that now feeds 84 million people.

Spain herself has even more immediate concerns. Poised to enter the Common Market, she needs to bolster her agriculture for a population of 36,350,000 people—only 20 percent of whom work the land. "Our aim," says Professor Carpena, "is to increase the yield of arable land by 30 to 40 times."

And there are other national needs that the Madrid center can help meet. In the view of Francisco Yndurain, vice rector of the Universidad Autonoma, Spain has been living on imported technology for too long. "The problem," he contends, "is basic science. You can raise the level of applied research very easily; it's much more difficult to raise the level of basic research."

Yndurain believes that the prospects for cooperation between IBM and his university are "brighter than ever." Computer science is being added to the curriculum; now, anyone studying physics or chemistry will also take courses in data processing.

"In the beginning," he says, "there was a feeling that the university merely wanted to show it was collaborating with private enterprise. Contracts were fostered by personal relations, but not built into the structure of the arrangement. Now all that is changing."

The "bridge" that José Luis Picon speaks of grows stronger all the time. □

No lack of missions

In Italy, they're studying the effect of local weather patterns on air pollution.

In France, they're looking into the possibility of helping deaf children to speak by means of "visual feedback."

In Israel and Austria, they're conducting research into the use of sound waves as an alternative to X-rays.

In Mexico, they keep track of soil erosion, water resources and crop acreage.

And so it goes. Throughout the nine IBM scientific centers in Europe, Latin America and Asia—others, in addition to those mentioned, are in Japan, Germany and the United Kingdom—projects of both national and international significance are moving ahead.

The projects may not be tied directly to short-term demands of the marketplace, but their long-term significance is unchallengeable. IBM Vice President and Chief Scientist Lewis M. Branscomb sums up the scientific center mission this way: "Our aims are to further computer science and to bring advanced data processing techniques to bear on pressing social, environmental and health needs."

In many instances, IBM scientists work with experts outside the company in partnership projects. Partners are usually universities, research establishments and government institutions.

Rizzo appointed to corporate posts

There's a new member of the IBM top management team. He's Paul J. Rizzo, IBM senior vice president and former group executive of the Data Processing Product Group.

In February, Chairman Frank T. Cary announced Rizzo's appointments to the Corporate Office and the Corporate Management Committee. In those chairs, he will help guide the company in both its day-to-day operations and long-range policy.

Rizzo will be the corporate office contact executive for John F. Akers, IBM vice president and group executive, DP Marketing Group, and for Dr. Arthur G. Anderson, IBM vice president, who succeeds Rizzo in his former DPPG post.

Rizzo, 51, received his B.S. degree from the University of North Carolina. He joined IBM as a methods analyst in 1958 and soon was making his mark in financial management. In 1964, he was elected controller of World Trade; the following year, he went to Armonk as IBM controller.

In 1970, Rizzo became vice president, corporate finance and planning staffs, and two years later, was elected to the IBM Board of Directors. He was named group executive of the DP Product Group in 1974.

Several years ago, Rizzo explained how the company works: Decisions, he said, are made "not by formula, but by people with good ideas who do their homework and take risks to move those ideas forward. As a result, they get ahead themselves."

Safety in Silver Valley

Where a false alarm is always welcome

by Spencer Kemmerer

"People back East don't understand lakes like this one," says Dave Billow, a General Systems Division marketing representative from Spokane, Washington. Billow makes a sweeping gesture as he swings his car past Idaho's Lake Coeur d'Alene. "I'm talking about the clearness of it. You can fly over that lake, and it's so pure that you can see the bottom—even when it's 40 or 50 feet below the surface." The road winds through the Bitterroot Mountains, past towns with names like Yellow Dog, past abandoned settlements folded into canyons like crumbs in the pleats of a napkin. Everywhere we are surrounded by sheer mountain cliffs and the erect trunks of tamaracks turned golden in the chill air of winter, by tall white pines and a few stands of ponderosa.

This is beautiful country. But it was not for its beauty that it was settled, nor for its beauty that it is known today. In the late 1880's, gold was discovered on the north fork of the Coeur d'Alene River. The word went out, and the people came in—people with names like "Wyatt Earp" and "Molly-be-Damned." Those who had hoped to find a major gold field were disappointed, and most turned back. A few searched further in the valley and found silver. In time, the settlers would rename this place "Silver Valley." Today, from its twenty-three-mile-long, nine-mile-wide area, over a third of America's silver and a major portion of its lead are mined.

Headquarters for most mining operations is Wallace, Idaho, population 1,839. Wallace is more peaceful now than it was around the turn of the century. There are no tramp miners running wild through the town, most of them one step ahead of the law. Nor does the valley ring with explosions as mills and mines are dynamited in labor disputes. But little else has changed. The streets look like ■ set for a rerun of *Gunsmoke.*

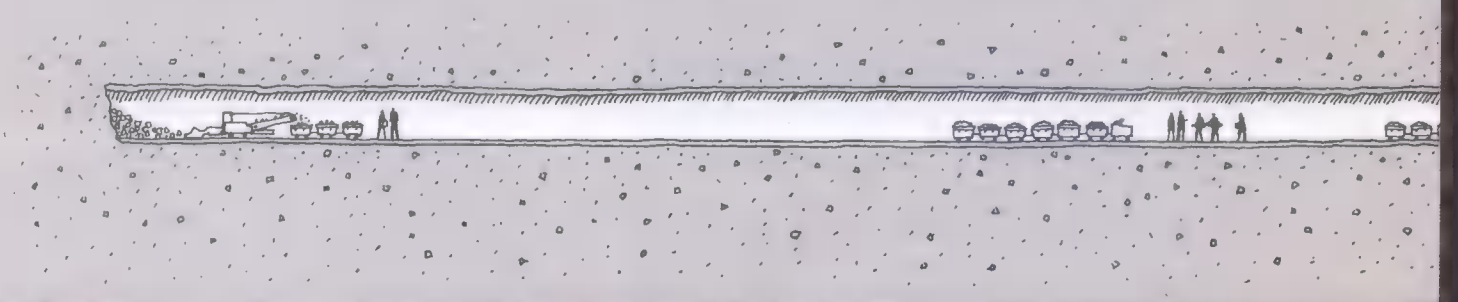
An unlikely place for computers, this Silver Valley, but computers, indeed, are here. In Hecla Mining Company's Star and Lucky Friday mines, IBM System/7s are helping to protect both miners and mine property against the damaging effects of rock bursts.

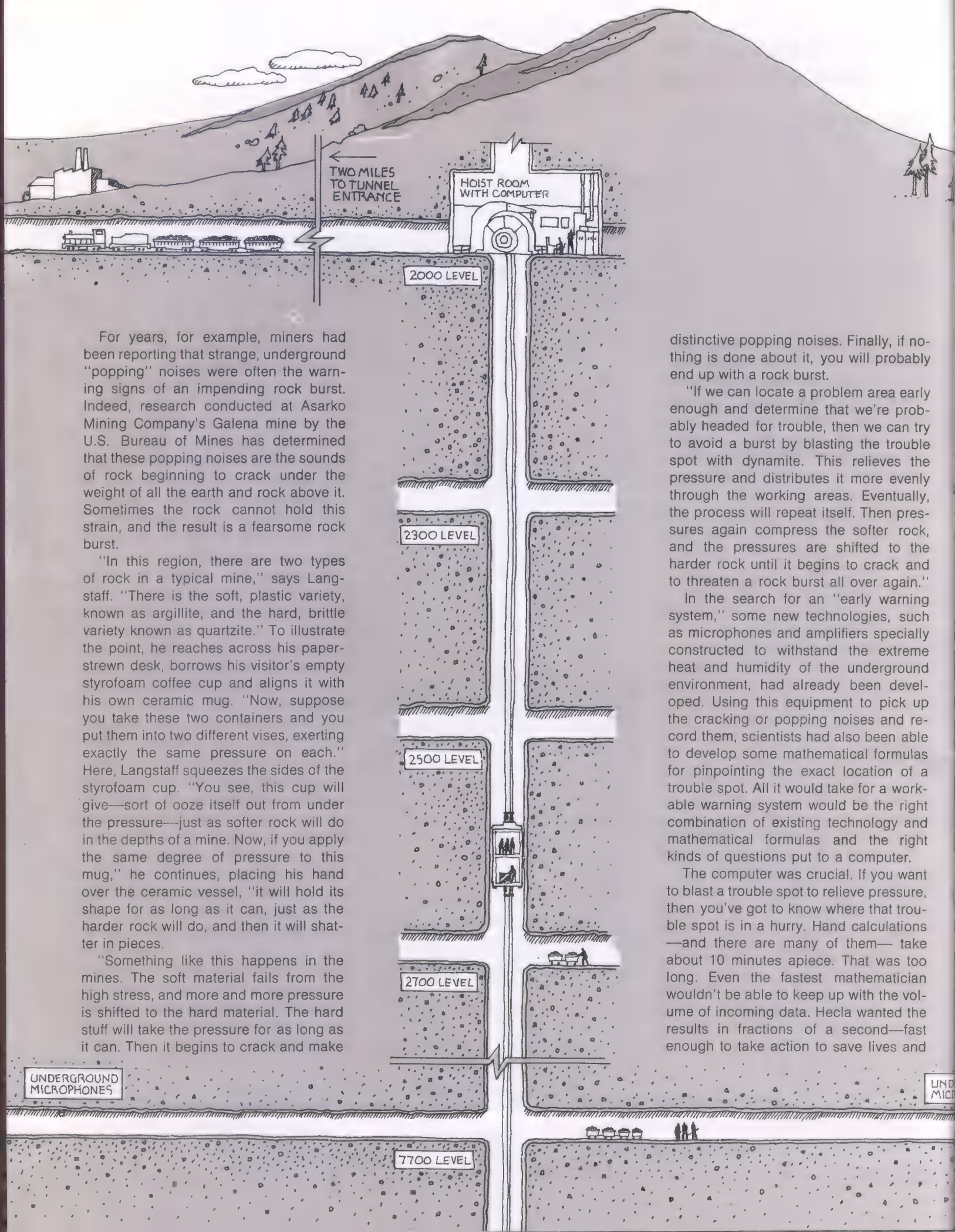
Rock bursts are dangerous. The mine walls shake during even a small one. Rock is thrown around the work areas, support timbers can snap, and slabs of hard rock can fall from the walls and ceilings. A burst in one mine tunnel means fallout in lots of others. Dust hangs in the air. "Even if a miner has never seen a burst," says George Landers, a foreman in Hecla's Lucky Friday mine, "he's probably seen the aftermath of one. And everyone who works underground can feel it when it happens."

It's difficult to assess the full cost of these bursts. In the gold fields of South Africa, rock bursts take more than ■ hundred lives a year. In the Kolar gold fields of India, they've been dreaded for nearly half a century. To the miners of Silver Valley, says Jon Langstaff, safety director for Hecla, "the most important problem may well be the psychological strain of living without warning." George Landers, the foreman, agrees: "If the walls of a mine tunnel collapse and knock the supporting timbers out, you're going to be trapped in a cave-in." And even if the miners are evacuated beforehand, the burst can still mean damaged equipment and costly work stoppages.

Hecla Mining Company resolved to do something about the problem. Like many other mining engineers, Jon Langstaff had access to the latest scientific literature on the subject. Drawn from several areas of technology and research, isolated bits and pieces of information began to brew in his mind. Then, in the early 1970's, theory and conjecture began to come together.

Spencer Kemmerer is a Chicago-based freelance writer and frequent contributor to such magazines as Cosmopolitan *and* Redbook.





For years, for example, miners had been reporting that strange, underground "popping" noises were often the warning signs of an impending rock burst. Indeed, research conducted at Asarko Mining Company's Galena mine by the U.S. Bureau of Mines has determined that these popping noises are the sounds of rock beginning to crack under the weight of all the earth and rock above it. Sometimes the rock cannot hold this strain, and the result is a fearsome rock burst.

"In this region, there are two types of rock in a typical mine," says Langstaff. "There is the soft, plastic variety, known as argillite, and the hard, brittle variety known as quartzite." To illustrate the point, he reaches across his paper-strewn desk, borrows his visitor's empty styrofoam coffee cup and aligns it with his own ceramic mug. "Now, suppose you take these two containers and you put them into two different vises, exerting exactly the same pressure on each." Here, Langstaff squeezes the sides of the styrofoam cup. "You see, this cup will give—sort of ooze itself out from under the pressure—just as softer rock will do in the depths of a mine. Now, if you apply the same degree of pressure to this mug," he continues, placing his hand over the ceramic vessel, "it will hold its shape for as long as it can, just as the harder rock will do, and then it will shatter in pieces.

"Something like this happens in the mines. The soft material fails from the high stress, and more and more pressure is shifted to the hard material. The hard stuff will take the pressure for as long as it can. Then it begins to crack and make distinctive popping noises. Finally, if nothing is done about it, you will probably end up with a rock burst.

"If we can locate a problem area early enough and determine that we're probably headed for trouble, then we can try to avoid a burst by blasting the trouble spot with dynamite. This relieves the pressure and distributes it more evenly through the working areas. Eventually, the process will repeat itself. Then pressures again compress the softer rock, and the pressures are shifted to the harder rock until it begins to crack and to threaten a rock burst all over again."

In the search for an "early warning system," some new technologies, such as microphones and amplifiers specially constructed to withstand the extreme heat and humidity of the underground environment, had already been developed. Using this equipment to pick up the cracking or popping noises and record them, scientists had also been able to develop some mathematical formulas for pinpointing the exact location of a trouble spot. All it would take for a workable warning system would be the right combination of existing technology and mathematical formulas and the right kinds of questions put to a computer.

The computer was crucial. If you want to blast a trouble spot to relieve pressure, then you've got to know where that trouble spot is in a hurry. Hand calculations —and there are many of them— take about 10 minutes apiece. That was too long. Even the fastest mathematician wouldn't be able to keep up with the volume of incoming data. Hecla wanted the results in fractions of a second—fast enough to take action to save lives and

equipment if the need to do so arose.

Langstaff met with Fred Brackebusch, Hecla's chief of data processing. "I need an immediate computer printout," Langstaff said, "that will automatically record the date, time, location and energy value of each cracking noise that could show we're headed for a rock burst. Do you think you can write a program for that?" Yes, Brackebusch replied, he could.

"We considered several manufacturers," Brackebusch allows, "but in the end, we chose IBM. We already had an IBM 1130. Through that, we developed a nice working relationship with Dave Billow, our account representative. Whenever we needed help with our 1130, Dave came right out from his office in Spokane. We're kind of in the boonies, you know, so that kind of service counts for something."

Billow grabbed Bud Belles, an IBM systems engineer who was also based at the Spokane office, and the two drove the 80 miles to Hecla's headquarters in Wallace, Idaho. There, Langstaff gave Belles the specifications for the sensing equipment he wanted to use. Back at his office, Belles arrayed them against a formidable stack of IBM computer manuals. His aim was to determine which equipment would work best with the sensing equipment Hecla had already chosen.

That wasn't the only problem. The program that Brackebusch was writing would have to be translated into computer language and recorded on cassette tape before it could be used in the IBM System/7, eventually chosen for the actual computations. The solution involved transmitting the program through two other IBM offices as well. "We were transmitting all over the West Coast before we were through," Billow remembers. "Here in Spokane, and to Seattle and Los Angeles."

Finally, the rock-burst detection system was ready for installation. Today, in Hecla's Star mine and in its Lucky Friday mine nearby, a series of microphones, cables, amplifiers, filters and energy-sensing equipment leads toward the insulated, air-conditioned spaces set aside for the two IBM System/7s and their teleprinters. At the Lucky Friday mine, they are located in an office complex on the surface; at the Star mine, the computer is located in a corner of the hoist room, two miles down a long, dark tunnel from the hillside opening to the mine. The hoist room is at the head of a shaft that goes down 8,100 feet to the deepest lead-zinc ore body in the world. There, with three-dimensional maps of every section of the two Hecla mines to guide them, expert technicians carefully stand watch.

Langstaff has no doubts about the value of this effort. "We've had occasions where the system showed that something unusual was going on in our mines, and we were able to evacuate the area just before a burst."

George Landers, the foreman, remembers a particularly close call. "We got the men out just 15 minutes before a burst knocked out about 50 to 75 feet of tunnel, and then it triggered a lot of secondary bursts. It was awful bad. Anyone who'd been caught in it could have been killed or trapped in the debris."

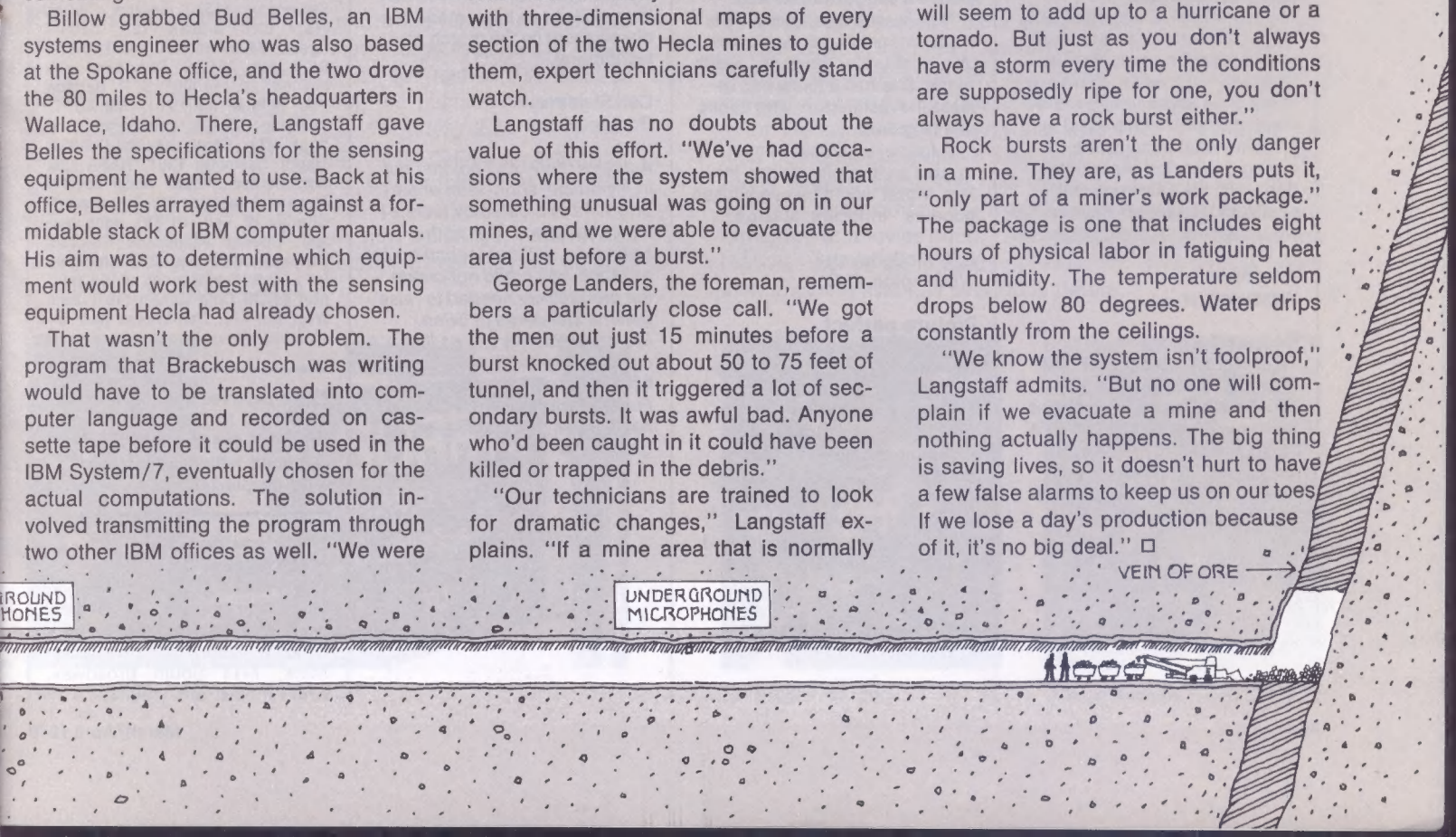
"Our technicians are trained to look for dramatic changes," Langstaff explains. "If a mine area that is normally very active suddenly becomes very quiet, or if an area that is normally quiet suddenly becomes very active, or if we see a lot of activity in a very short space of time, we tend to become suspicious.

"It's something like the creaking of a wooden ship at sea. The captain isn't going to call 'Abandon Ship' just because his boat is making some creaking noises, but there are levels of creaking that might start him thinking about it."

But while the rock-burst detection system is now a permanent part of the Hecla safety program, mining engineer Langstaff avoids any undue claims. "We haven't reinvented the wheel," he warns. "We're in more of an art than a science. It's something a bit like weather forecasting: you can add up all the meteorological variables—the temperature, air pressure, humidity and so forth—and it will seem to add up to a hurricane or a tornado. But just as you don't always have a storm every time the conditions are supposedly ripe for one, you don't always have a rock burst either."

Rock bursts aren't the only danger in a mine. They are, as Landers puts it, "only part of a miner's work package." The package is one that includes eight hours of physical labor in fatiguing heat and humidity. The temperature seldom drops below 80 degrees. Water drips constantly from the ceilings.

"We know the system isn't foolproof," Langstaff admits. "But no one will complain if we evacuate a mine and then nothing actually happens. The big thing is saving lives, so it doesn't hurt to have a few false alarms to keep us on our toes. If we lose a day's production because of it, it's no big deal." □



to think

Running account

"There's Something About a Jogger" *[January/February 1979]* was an amusing expression of the current non-running backlash. However, anyone who is starting or considering jogging should be cautioned that two of the items in "the code" of the Joggensus are contrary to practices which should be followed to avoid injury.

First, it is not a good idea to run every day. The body should have one or two days of rest each week. If bones and tissues do not get a chance to recuperate occasionally, stress fractures, tendonitis and muscle strains are more likely to occur.

Second, joggers should never ignore pain. "Listen to your body" is emphatic advice in almost all guides for runners. To do otherwise is an open invitation to injury or worse. There are many things about joggers to make fun of. To suggest, even in a humorous article, that this is part of a jogger's "code" is unnecessary and even somewhat irresponsible.

So please, if you are a jogger, listen to your body. Its warning words are pain and fatigue. Respond with appropriate changes and rest.

Bruce Cunningham
Essex Junction, Vt.

More on benefits

The November/December 1978 issue of *Think* has an excellent article regarding benefits due its workers. However, there are many of us approaching retirement and we are interested in knowing what benefits are during this period. An article done with the same general, easily understandable layout would appeal to us old timers.

John Natalo
Westwood, N. J.

Respectfully

The number one belief of IBM "respect for the individual" could not be better exemplified than your recent article on IBM South Africa [*November/December 1978*]. Positive proof again of IBM's concern for the people.

D. E. Bean
Don Mills, Ontario, Canada

Third person singular

I very much enjoyed Harrison Kinney's article on South Africa in the November/December 1978 issue. He has given me a good understanding of the situation there, much more so than many newspaper articles have done.

I must take issue with his stilted, unnatural use of the third person when referring to himself. It detracted from the article very much.

Several times he refers to himself as "the visitor." Each time I had to think a while to figure out who "the visitor" was. Please, Mr. Kinney, use "I," "me," "my." It's so much more readable. Otherwise, thanks for the excellent article.

Bill McCray
Lexington, Ky.

Author's reply: Admittedly, the third-person journalistic convention is sometimes clumsy, but its intent is to keep the focus on the story, not the writer. In this instance, it seemed especially important to remind the reader that the writer was only an inquisitive visitor, not the knowledgeable expert that the first-person connotes.

In her own write

Enjoyed the article in January/February *Think* by Milton Viorst. Here's a suggestion for you.

Mr. Viorst's wife, Judith, is a most entertaining writer in her own right under the name Judith Viorst. She has a following, at least in Washington, who thinks she is great.

A follow-up article from a woman's viewpoint written by Mrs. Viorst would be every bit as good as "Innocent, at large."

L. T. McCullough
Washington, D.C.

Picture perfect

I have just seen a copy of the November/December 1978 issue of *Think* and had to write to you to congratulate you on the excellent and informative article on the development of the 64K chip. As for the incredible photo of the chip itself, what can I say! A more beautiful piece of technology is hard to imagine.

G. W. Jack
North Harrow, Middlesex,
England

Chip, chip, hooray

I have read your article on Samos [the 64K-bit chip] in the November/December 1978 issue of *Think*, and I found it to be most interesting, clearly written, fair to everybody involved, promoting the understanding of a technically complicated matter and an organizationally and psychologically complex development process. My very best congratulations!

Dr. Gunter Hellbardt
Boeblingen, Germany

Mixed blessings?

George Cruikshank completely misses the central issue of the technology debate in his January/February "Think essay" on "Rx for Unemployment, More Technology." He states that, on the one hand, technology will create more employment while, on the other hand, it will create more leisure while making obsolescent some of the skills of individual workers. This is simply not possible. As most economists know, an increase in employment must decrease leisure [because] employment and leisure are direct substitutes for each other. Furthermore, increased leisure may be a "good" for an overworked member of the technological elite; however, leisure weighs heavily on the hands of the unemployed worker whose lifelong skills have been made obsolescent by the march of technology.

Carl Steidtmann
Boulder, Colo.

Author's reply: As I pointed out in my article, short-term unemployment is created by technological advance. But, at the same time, without technological advance, you could not create the productivity needed to raise general standards of living. Moreover, history shows that employment and leisure have both *increased over the years. For example, while payrolls have grown, the work week has grown shorter.*

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Think's editor is a masochist

Tell him what you don't like. And why. Or, if you want to be perverse, what you do like. And why. Write a Letter to the Editor, *Think*, 7-11 South Broadway, White Plains, N.Y. 10601.

catch up

Hard line on computer fraud

Stiffer penalties for computer crime are reflected in a new version of the Federal Computer Systems Protection Act recently reintroduced in the Senate. Instead of a maximum fine of $50,000 called for in the original version of the bill, the proposed legislation now calls for two and one half times the amount stolen or destroyed. As before, a person could also be subject to a jail term of up to 15 years. The main section of the bill makes it a Federal crime to "knowingly and willfully access" a computer "for the purpose of perpetrating fraud or obtaining money, property or services under false or fraudulent pretenses." The bill has broad bipartisan support.

Warm-up for the Olympics

Take 8,000 empty beds in Moscow. Try to rotate 20,000 Americans through them—so that each visitor can attend five allotted days at the 1980 Summer Olympics while in the Soviet Union—and you begin to understand why E. Wallace Lawrence III relies on an IBM computer to keep things sorted out. Lawrence, appointed head of the Russian Travel Bureau in New York City by the U.S. Olympic Committee, is using a System/370 Model 138 to keep track of booking information, such as how many people are traveling in the same party and whether they are members of the same family; to provide visa requirements for the Soviet Consulate; and to keep on top of such billing information as credit cards and travel agent commissions.

Industry helps on energy

Citing the cutoff in Iranian oil and price hikes by a number of countries, *Newsweek* says that energy experts are "suddenly echoing Jimmy Carter's call for restraint in national energy use." The biggest saving, the publication says, has come from the industrial sector—including IBM, which has been "aided by its own sophisticated computer systems." According to the Real Estate and Construction Division, IBM has cut energy consumption by 42 percent since 1973, for a saving of $115 million; all of its new buildings, meanwhile, are being designed to use 50 percent less energy per square foot than pre-1973 buildings.

Toward tomorrow's office

"IBM's latest announcement of what the information-processing industry calls 'an intelligent printer' is clearly leading the way into a major new market," reports *Business Week.* "As one expert puts it, 'This is the most significant product from IBM in a long time.' " Describing the IBM 6670 Information Distributor's ability to communicate with distant computers, terminals and other machines, the magazine calls the product "a pivotal component in IBM's strategy to link computers and word processing equipment into one big system—the much-touted 'office of the future.' "

A case of shuttle diplomacy

They tried to persuade the short man to step from behind the controls of NASA's Space Shuttle simulator at the Johnson Space Center, but China's Deputy Prime Minister Teng Hsiao-ping was having too much fun. With the help of the Federal Systems Division's System/4 Pi computers, cockpit displays and software, he insisted on "landing" the Shuttle twice from an altitude of 100,000 feet. Over the past four years, FSD people at Houston and Cape Canaveral have delivered more than 3¼ million lines of code for computer programs. These include flight programs for such jobs as launch, entry and landing, ground programs for prelaunch checkout and launch countdown events, and command and control programs to assist Mission Control in monitoring Shuttle flights.

'Something extraordinary'

Press reaction to the January 30 announcement of IBM's new 4300 processors clearly signaled that something extraordinary was in the offing. According to *The New York Times,* industry observers put the computing performance of the new products at four to five times that of models 138 and 115 —for the same cost. Noting that IBM was "detonating the time bomb its competitors had been bracing for," *The Wall Street Journal* said, "the new products more or less match analysts' expectations for machines that deliver more performance at a lower price." And *Business Week* quoted one IBM-watcher as calling the improvement "dramatically better than anything IBM has ever done before."

Restraint at the pump

Teng at the controls

New processors take shape

International Business Machines Corporation
Armonk, N.Y. 10504

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